MapInfo

Desktop Mapping Software

Reference

MapInfo
Reference

MapInfo Corporation
Troy, New York

Information in this document is subject to change without notice and does not represent a commitment on the part of the vendor or its representatives. No part of this document may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, without the written permission of MapInfo Corporation, 200 Broadway, Troy, New York 12180.

© Copyright Mapping Information Systems Corporation, 1985-1992. All rights reserved.

MapInfo Corporation can be contacted by phone at:

- Voice: (518) 274-6000
- Fax: (518) 274-6066
- Sales Information and Order Hotline: (800) FAST-MAP
- Technical Support Hotline: (800) FAST-MAP
- Technical Support Fax: (518) 274-9089

Toll-free telephone support is available in the U.S. and Canada for the first 90 days after you order the product. After this period, you can purchase technical support annually from MapInfo to access technical support staff.

MapInfo® is a registered trademark of Mapping Information Systems Corporation.

MapBasic is a trademark of Mapping Information Systems Corporation.

Changing the Way the World Looks at Information® is a registered trademark of Mapping Information Systems Corporation.

Other products named herein may be trademarks of their respective manufacturers and are hereby recognized.

MapInfo welcomes your comments and suggestions.

MapInfo Reference: Table of Contents

Preface
About MapInfo 1
Add Workspace 2
Align Objects 3
Append 11
Arc Tool 12
Arrange Icons [MapInfo for Windows only] 17
Assist 18
Break Polygon 19
Bring to Front 20
Browse 21
Buffer 25
Calculate Statistics 28
Cascade Windows 31
Change View 32
Choose Projection 34
Clear 36
Clear Cosmetic Layer 37
Clear Objects Only 38
Close 39
Close All 40
Copy 41
Cosmetic Layer 42
Create Drop Shadows 44
Create Points 46
Customize Legend (Graph) 48
Customize Legend (Map) 50
Cut 54
Delete Table 56
Digitizer Setup 57
Display Options 64
Draw Autolabels 67
Edit (Browser) 69
Ellipse Tool 70
Exit [Quit] 72
Export 73
Export Window 78

Expression 80
Find 85
Find Selection 89
Font 90
Frame Tool 91
Geocode 97
Get Info 104
Grabber Tool 105
Graph 107
Graph Type 108
Help 116
Import 117
Info Tool 129
Join 131
Join Tables 134
Label Axis 137
Label Tool 138
Layer Control 141
Layer Settings 143
Layout 147
Layout Size 152
Line Tool 155
Map 156
MapBasic Tool 159
Merge from Clipboard 160
Merge Using Column 163
Modify Structure 169
New 171
New Record 177
Open 178
Pack 184
Paste 185
Pick Fields 186
Pick Fill 187
Pick Font 190
Pick Line 192
Pick Symbol 195
Polygon Tool 197
Polygon Search Selector Tool 199

Polyline Tool 200
Preferences 202
Previous View 209
Print 210
Radius Search Selector Tool 213
Rectangle Tool 214
Redraw Window 216
Rename Table 217
Reshape 219
Revert 221
Rounded Rectangle Tool 222
Ruler Tool 224
Run 225
Save 226
Save Copy As 227
Save Cosmetic Objects 230
Save Workspace As 231
Select 232
Select All 234
Select Tool 235
Send to Back 239
Series 240
Set Map Units 243
Shade by Value 245
Show/Hide Grid 246
Show/Hide Legend 247
Show/Hide Line+Fill Picker 248
Show/Hide MapBasic Window 249
Show/Hide Statistics 252
Show/Hide Symbol Picker 253
Show/Hide Tool Palette 254
Smooth 256
SQL Select 257
Startup.Wor 269
Symbol Tool 271
Text Style 272
Text Tool 273
Tile Windows 278
Undo 279
Unselect All 280

Unsmooth....281
Update Column....282
Value Axis....284
View Actual Size....289
View Entire Layer....290
View Entire Layout....291
Zoom-in Tool....292
Zoom-out Tool....294
Appendix 1: MapInfo Data Interchange Format....297
Appendix 2: Converting Files from MapInfo for DOS to MapInfo for Windows....309
Appendix 3: Advanced Geocoding....313
Appendix 4: Converting Coordinates....329
Appendix 5: Creating Expressions....331
Appendix 6: Creating Your Own Coordinate System....363
Appendix 7: Shade by Value....375
Glossary....399

Preface

Welcome to the *MapInfo Reference* manual, because MapInfo's desktop mapping system contains so many easy and useful functions, you may find yourself only occassionally referencing this manual. However, when you do need help, the body of this manual is organized from A-Z according to menu option names, tool names, and key words or phrases for quick and easy referencing. The Appendices contain detailed information that is particularly useful for the more advanced MapInfo user.

The *MapInfo Reference* manual is designed for the Windows, Macintosh, Sun, and Hewlett Packard platforms with screen images from Windows. For a general-purpose introduction to MapInfo, see the *MapInfo User's Guide*.

New features of MapInfo 2.0 include:

- New geographic SQL extensions including Within, Contains and Intersects as well as geographic related joins.
- Over 100 new map coordinate systems and projections (Mercator, Albers, Lambert, State Plane, and many more) that can be changed "on the fly".
- Buffering of any object on a map including points, polygons, lines and polylines.
- Polygon analysis functions, including union and intersect.
- Advanced digitizing (multiple control points)
- Improved geocoding
- New presentation layout window for combining many elements on a single page.
- Parallel street labeling
- Multiple page map output
- Over 100 new line types and fill patterns
- Custom symbol generator

For those of you unfamiliar with desktop mapping or other database management systems, you should first perform the tutorial in the platform-specific Getting Started manual. The Getting Started manual also contains installation and startup instructions.

Those who are unfamiliar with windowing environments should also perform the tutorial.

About MapInfo

Menu Path

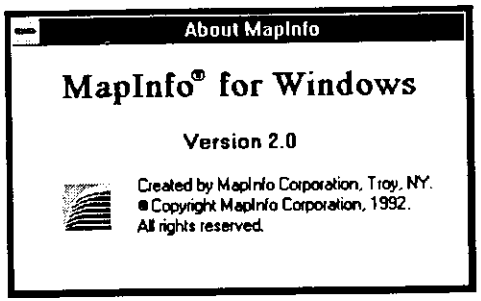
File > About MapInfo

Option Enabled ...

Always.

Purpose

About MapInfo allows you to display a dialog that tells you which release of MapInfo you are using.



Add Workspace

Menu Path

File > Add Workspace

Option Enabled If ...

Always.

Purpose

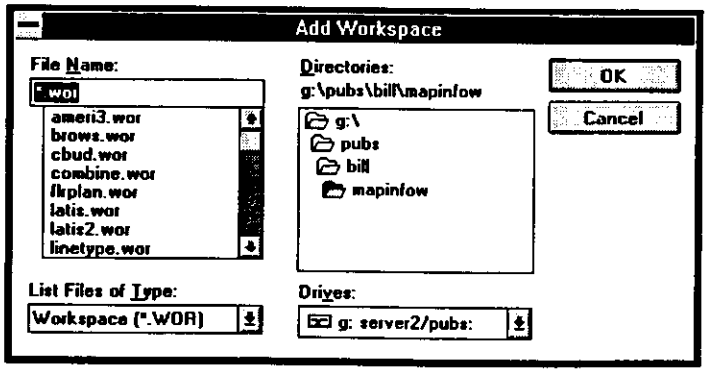
Add Workspace allows you to open a workspace that has been previously saved (for more information on saving workspaces, see Save Workspace As). A workspace stores a list of open tables, windows, and window positions.

Using Add Workspace

Note: When you only want to work with the tables and windows from the new workspace, choose Close All from the File menu before opening the workspace. Otherwise, the new workspace's tables and windows are added to those already open.

To add a workspace:

1. Choose Add Workspace from the File menu and the Add Workspace dialog is displayed:



2. Choose a workspace from the Add Workspace dialog.
3. Click OK.

See Also

Save Workspace As , Startup.Wor.

Align Objects

Menu Path

Window > Layout > Align Objects

Option Enabled If ...

A Layout window is the active window and any object in the Layout is selected.

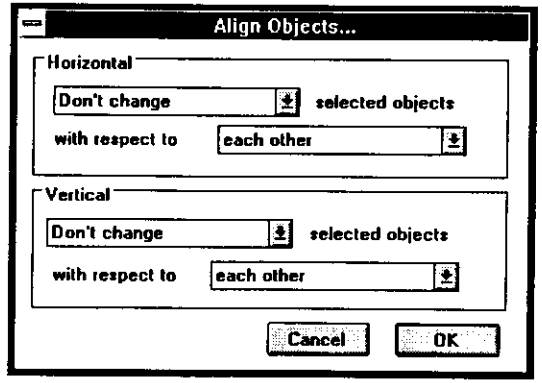
Purpose

Align Objects allows you to align objects with each other both horizontally and vertically.

Using Align Objects

To align one or more objects in the Layout window:

1. Click on one object
   or,
2. Hold down the <SHIFT> key and click on several objects
   or,
3. Choose Select All in the File menu to select all of the objects in the layout.
4. Choose Align Objects from the Layout menu and the Align Objects dialog is displayed:

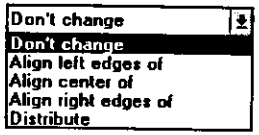


The dialog's menus are used to specify your vertical and horizontal settings.

Horizontal settings govern the left-to-right position of objects.

5. Choose the appropriate horizontal setting.

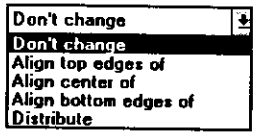
The options available are:



Vertical settings govern the top-to-bottom position of objects.

6. Choose the appropriate vertical setting.

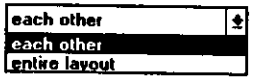
The options available are:



For both horizontal and vertical settings, you must also specify alignment with respect to each other or to the entire layout.

7. Choose align objects with respect to.

The options available are:



When you have chosen the setting you want:

8. Click OK.

The objects selected are aligned according to the specifications you set. (See the following examples.)

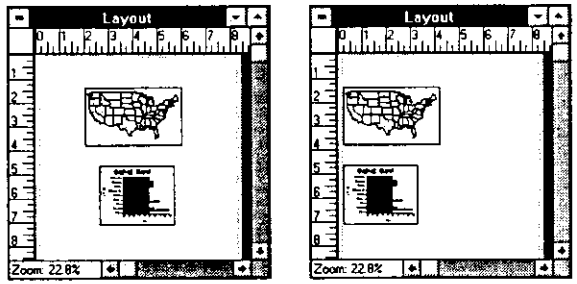
Note: Your alignment settings are saved from one use to the next within a session. Be sure to check both the vertical and horizontal settings before you click OK.

Examples of Aligning Objects with Entire Layout

Horizontal Alignment

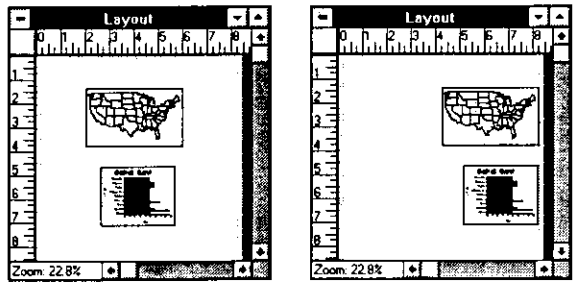
When you choose entire layout, the objects are aligned with respect to the top, bottom, left, and right edges of the Layout.

When you align by the left edges, the left edges of the selected objects move to the edge of the Layout. When there is a left margin, the objects move to that margin.



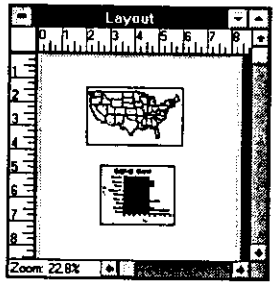
Before After

When you align by the right edges, then the right edges of the selected objects move to the edge of the Layout. When there is a right margin, the objects move to that margin.

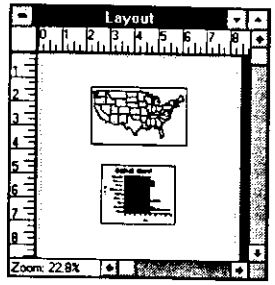


Before After

When you align to the center, the horizontal centers of the objects move to the horizontal center of the page.

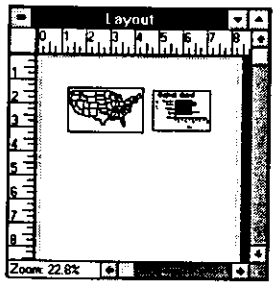


Before

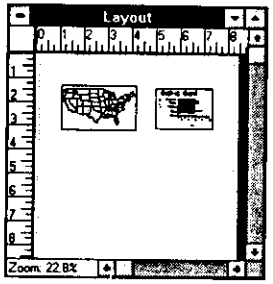


After

When you distribute the objects, MapInfo evens the horizontal space between them.



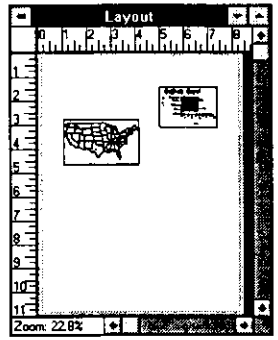
Before



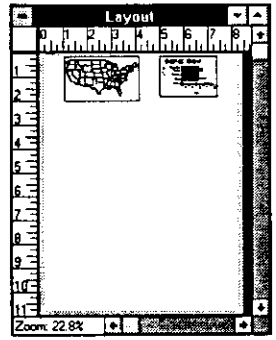
After

Vertical Alignment

When you align by the top edges, the top edges of the selected objects move to the top edge of the Layout. When there is a top margin, the objects move to that margin.

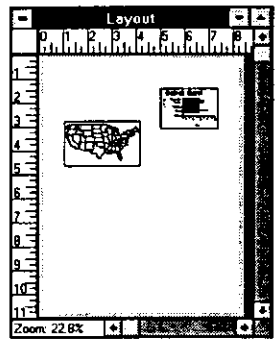


Before

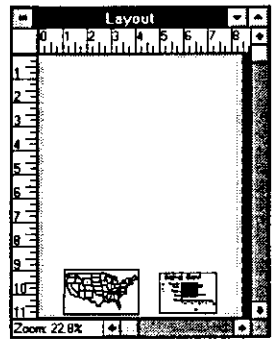


After

When you align by the bottom edges, the bottom edges of the selected objects move to the bottom edge of the Layout. When there is a bottom margin, the bottom edges of the objects move to that margin.

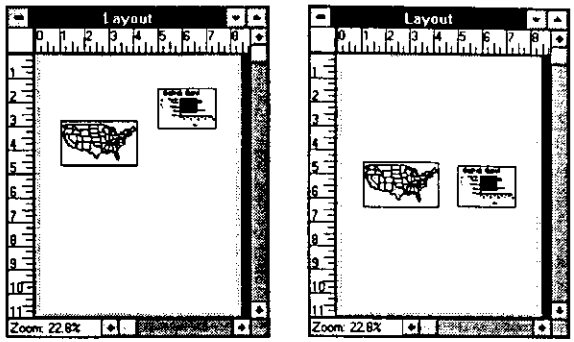


Before



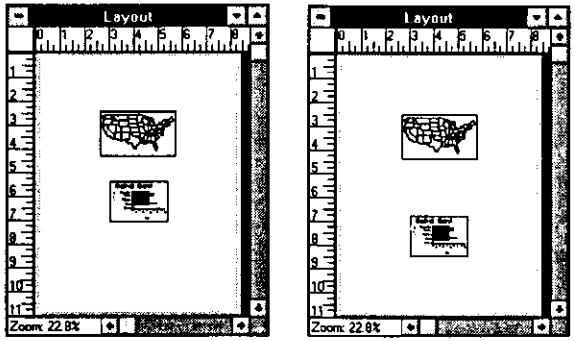
After

When you align to the center, vertical centers of the objects move to the vertical center of the page.



Before After

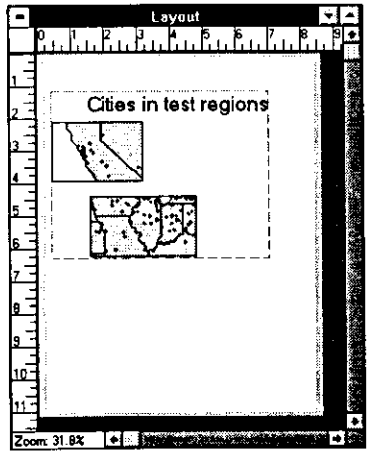
When you distribute the objects, the vertical space between the objects and the margins is distributed evenly.



Before After

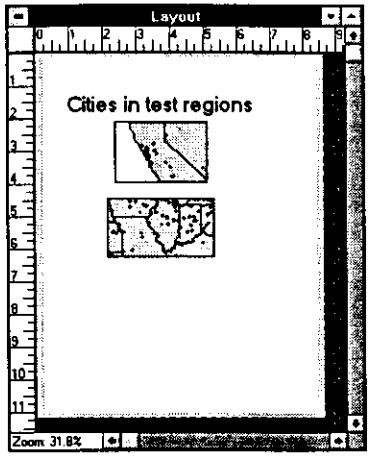
Alignment with Each Other

When you align objects with each other, the objects are aligned with respect to an imaginary rectangle (called the bounding rectangle) that completely encloses those objects. The following illustration shows three objects and their bounding rectangle (dotted lines):

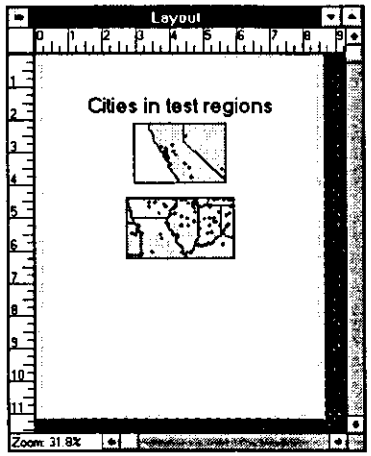


The horizontal settings position these objects at the top, bottom, or horizontal center line of the bounding rectangle rather than at the edges of the Layout. The vertical settings position these objects at the left, right, and vertical center line of the bounding rectangle.

The following illustration shows objects horizontally aligned by their centers with respect to each other.



These objects, while horizontally centered in relation to one another, are not centered in the Layout. That is because their bounding rectangle is slightly to the left of the Layout's center. When we align the objects with respect to the Layout, they look like this:



Append

Menu Path

Table > Append

Option Enabled If ...

Two tables are open.

Purpose

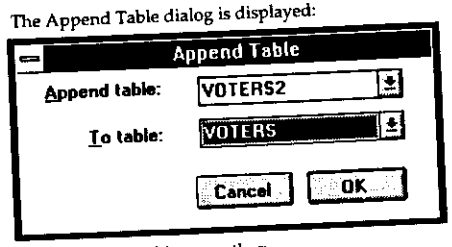
Append allows you to attach the records of one table to another table.

Using Append

To access the Append Table dialog.

1. Choose Append.

The Append Table dialog is displayed:



To append one table to another:

2. Choose the table being appended from the dialog's Append table menu.
3. Choose the table that the first table is being appended to from the dialog's To table menu.
4. Click OK.

When appending data, MapInfo takes data from columns in one table and puts that data into columns having corresponding positions in the other table. When the corresponding columns do not have the same data type, MapInfo does its best to convert data to the appropriate type. When the columns of the two tables are not ordered properly, so that columns with corresponding positions do not have corresponding data, use Modify Structure to change the order of the columns in one of the tables.

You can also use SQL Select to reorder the columns of one of the tables and then append the results of that SQL Select.

See Also

Modify Structure, SQL Select, Join

Arc Tool

Tool Enabled If ...

A Layout window or an editable Mapper is active.

Purpose

The Arc tool allows you to create a curved line that is the size and shape of one quarter of an ellipse. Once you have created such an arc, you can reshape it so that it spans more, or less, than one quarter of an ellipse.

Using the Arc Tool

To create an arc:

1. Choose the Arc tool from the Tool palette.
2. Move the cursor to where you want to begin drawing the arc.

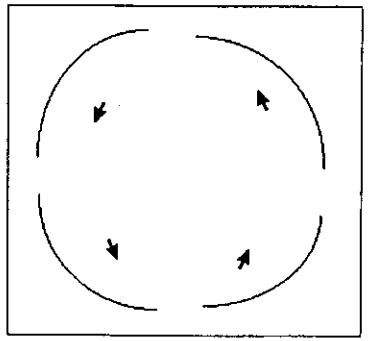
When you want to draw an arc that is a quarter of a circle, hold the <SHIFT> key down while drawing.

3. Press and hold down the mouse button.
4. Move the cursor.

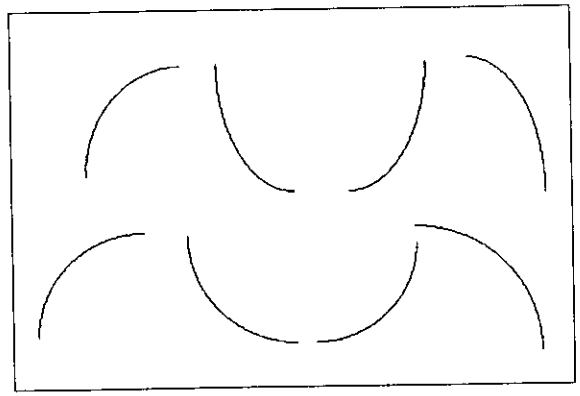
The arc appears on the screen and changes size and proportion as you move the cursor.

5. Release the mouse button.

When the arc does not curve in the direction you want it to, redraw it in the same place but move the mouse in the opposite direction. The following illustration shows four arcs with arrows indicating the direction in which they were drawn:



The Arc tool creates an arc that is one quarter of an ellipse. The endpoints are at 0, 90, 180, or 270 degrees on the ellipse.



The four arcs at the top of this illustration were created with the Arc tool in its normal mode. The four arcs at the bottom are quarter circles. To create a quarter circle, hold the <SHIFT> key down while drawing the arc.

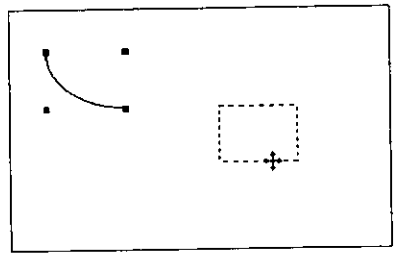
Repositioning an Arc

To reposition an arc:

1. Position the Select tool at one of the two endpoints.
2. Press the mouse button and hold it down.

The cursor becomes a four-way arrow.

3. Drag the arc to a new position.
4. Release the mouse button, and the arc moves to the new position.



Resizing an Arc

To resize an arc:

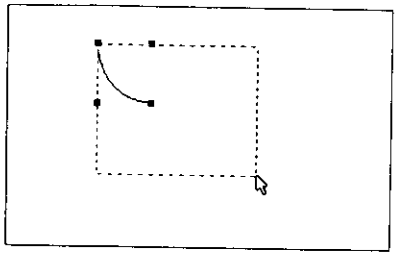
1. Choose the arc by clicking on either end with the Select tool.

Four edit handles — small squares — appear around the arc indicating that it is now selected for editing.

2. Click on any of the four edit handles and drag it in the appropriate direction.

When you drag an edit handle, a dotted box appears around the arc. Drag the edit handle until you have resized the arc appropriately.

3. Release the mouse button, and the arc resizes according to the size of the box.



When the mouse button is released, the arc resizes so that it extends to the lower right corner of its bounding rectangle.

Reshaping an Arc

There are two ways to reshape an arc. You can change the arc's attributes by typing new values into the Arc Attribute dialog, or you can reshape an arc by directly manipulating its endpoints.

Reshaping an arc by direct manipulation

1. Select the arc by clicking on either end with the Select tool.

Four edit handles — small squares — appear around the arc indicating that it is now selected for editing.

2. Choose Edit > Objects > Reshape.

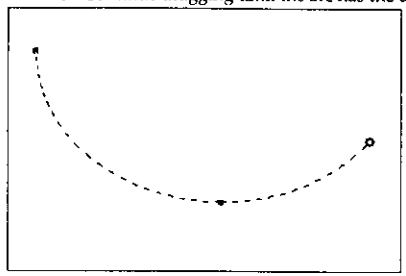
A small box (node) appears at both the start, and end-points of the arc. The cursor changes to a small square with cross-hairs.

3. Position the cursor over one of the nodes.

4. Click on the node and drag it to a new location.

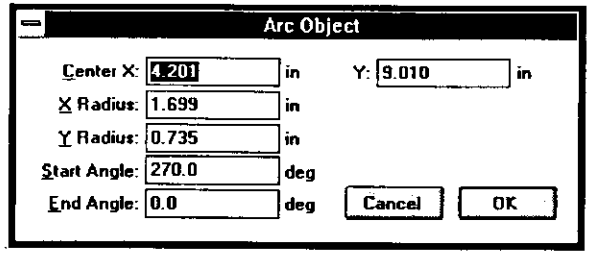
The selected node becomes hollow. This node moves along the arc's ellipse and the angle between the two end nodes changes, reshaping the arc.

5. Continue dragging until the arc has the desired shape.



Reshaping an arc through its attributes box

1. Double-click on the arc with the Select tool, and the Arc Object dialog is displayed:

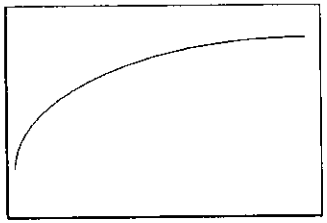


2. Type in a new Start Angle and/or End Angle, as appropriate.
3. Click OK.

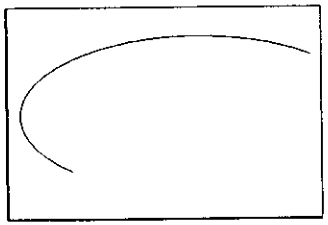
Center X,Y	The center of the arc's ellipse specified in X and Y coordinates.
X Radius	The horizontal distance from the center of the arc's ellipse to the rightmost (or left most) point.
Y Radius	The vertical distance from the center of the arc's ellipse to the topmost (or bottom most) point.
Start Angle	The angle of the arc's starting point on its ellipse.
End Angle	The angle of the arc's end point on its ellipse.

The arc is reshaped to fit the specified starting and ending angles.

For example, the following arc has a starting angle of 180 degrees and an ending angle of 270 degrees:



By giving it a starting angle of 135 degrees and ending angle of 310 degrees, you can reshape it like this:



Arrange Icons [MapInfo for Windows only]

Menu Path

Window > Arrange Icons

Option Enabled If...

At least one of the following is open and in icon form: Browser, Mapper, Grapher, MapBasic, Layout, or Help.

Purpose

When you have minimized a number of windows and moved their icons around, select Arrange Icons to arrange them in an orderly fashion.

Assist

Menu Path

Analyze > Select > Assist

Option Enabled If...

A Mapper is the active window.

Purpose

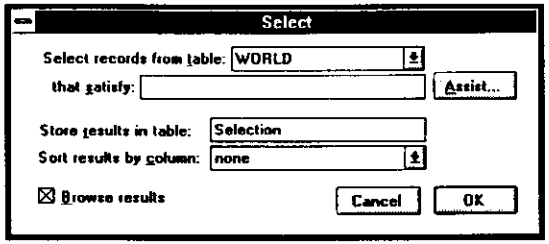
Assist allows you to access the Expression dialog from the Select dialog.

Using Assist

To use Assist and access the Expression dialog:

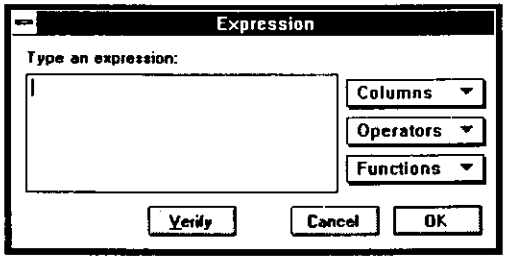
1. Choose Select from the Analyze menu.

The Select dialog is displayed:



2. Choose Assist from the Select menu.

The Expression dialog is displayed:



Use the Expression dialog to formulate mathematical and alphanumeric expressions.

See Also

Expression

Break Polygon

Menu Path

Edit > Break Polygon

Option Enabled If...

A Mapper is active, the layer is editable, and an editable object(s) is selected.

A Layout is active and a polygon is selected.

Option is not enabled when the Browser or Grapher is active.

Purpose

Break Polygon allows you to turn a polygon into a polyline.

Using Break Polygon

When you choose Break Polygon, the selected polygon is broken at the point where the beginning and the end-point meet. The resulting object changes from a polygon to a polyline. Any fill that the polygon has disappears.

Break Polygon only works for regions that contain only one polygon. For example, you cannot perform Break Polygon with the state of California, which consists of several polygons. (It has islands off the coast.)

Bring to Front

Menu Path

Window > Layout > Bring to Front

Option Enabled If ...

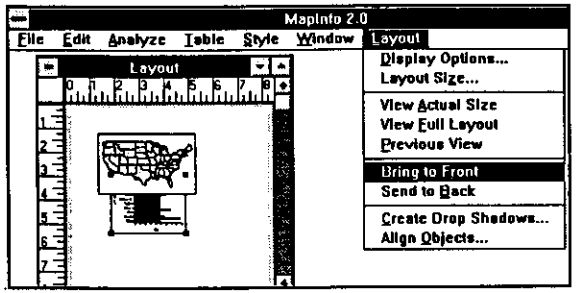
Any Layout objects are selected.

Purpose

Bring to Front allows you to bring an object out from behind objects that are covering it.

Using Bring to Front

All objects in a Layout are ordered from front to back. Think of the frames and other graphic objects as being stacked in the Layout. When you draw a new object, it is automatically the front-most object and overlaps any other object in the Layout. You can use the Send to Back and Bring to Front commands to change the order of objects. Once a frame is selected, the commands are performed from the Layout menu



Choose Bring to Front to move the currently chosen object or objects in front of all other objects. Use Bring to Front in conjunction with Send to Back to re-order overlapping objects. You can move any number of objects simultaneously. The selected objects maintain their relative front-to-back order and are placed in front of all other objects.

To use Bring to Front:

1. Choose the object or objects you want to move.
2. Choose Bring to Front.

When the object you want to choose is behind other objects,

3. Press <CONTROL> [<Command >] while using the Select tool.

The Select tool cycles through overlapping objects starting with the top-most one.

See Also

Send to Back, Layout

Browse

Menu Path

Window > Browse

Option Enabled If ...

At least one table is open.

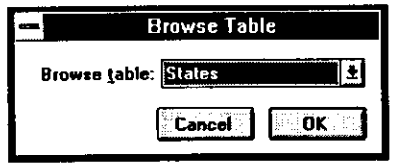
Purpose

The Browse option allows you to view textual data in table form.

Using a Browser

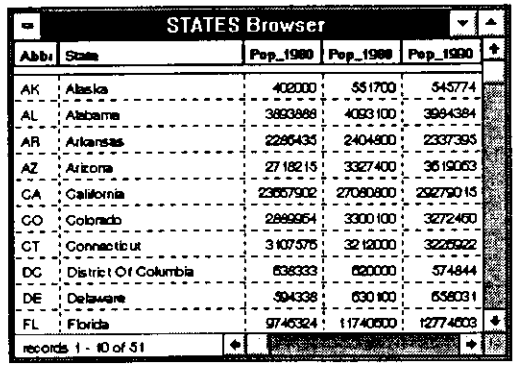
When only one table is open, the table's name immediately follows the Browse command (e.g., Browse States, Browse Customers). Choosing Browse displays a Browser of that table.

When more than one table is open, choosing Browse displays the Browse Table dialog:

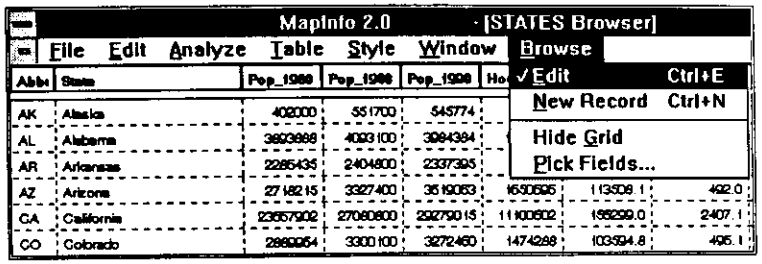


1. Choose a table from the Browse table menu.
2. Click OK.

A Browser for that table is displayed.



At the same time, the menu to the right of the Window menu becomes the Browse menu. The Browse menu contains menu options used with Browsers and is active whenever a Browser is the active window.



If the table you want to browse is not open, it is not displayed in the Browser. Open the table with File > Open. You have two options:

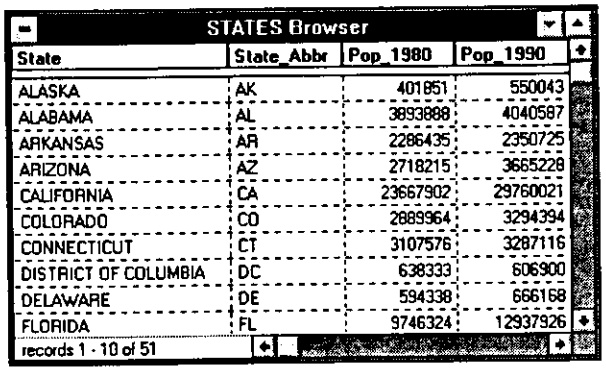
- You can open the table with the Browser option checked in the Windows to Use section of the Open dialog. The table is automatically displayed in a Browser

  or,

- Open the table without checking the Browser option. To display the table in a Browser, choose Window > Browse.

Working with Browsers

Browsers allow you to view and manipulate your data in traditional row-and-column format. You can change records in your database, add new ones, or delete existing records. If you have ever worked with spreadsheets or databases, you are probably familiar with the following Browser format.


STATES Browser
State State_Abbr Pop_1980 Pop_1990
ALASKA AK 401851 550043
ALABAMA AL 3893888 4040587
ARKANSAS AR 2286435 2350725
ARIZONA AZ 2718215 3665228
CALIFORNIA CA 23667902 29760021
COLORADO CO 2889964 3294394
CONNECTICUT CT 3107576 3287116
DISTRICT OF COLUMBIA DC 638333 606900
DELAWARE DE 594338 666168
FLORIDA FL 9746324 12937926
records 1 - 10 of 51

Each row of the table contains one record, and each column in the record contains information about a particular field (e.g. last name, street address, order number, price, and so forth). The name of the table is in the title bar. The titles of the columns are printed at the top of the columns beneath the title bar. An info bar displays how many records are in the table and which of those records currently appear in the Browser.

Scrolling a Table

A Browser allows you to view tabular data in your table. Use the vertical scroll bar to view various ranges of records. Use the horizontal scroll bar to see different sets of columns.

Rearranging Browser Column Order

Sometimes the default order of columns in a Browser is not the order you want for a particular session. You may want to change the default order but not change the structure of the underlying table.

To make a temporary change to the columns in a Browser:

1. Move the cursor over the column heading in the Browser

The cursor changes to a hand.

2. Click and hold the mouse button to select the column. While pressing the mouse button, drag the mouse left or right to move the column to a new location.

The heading of the column you are moving is highlighted.

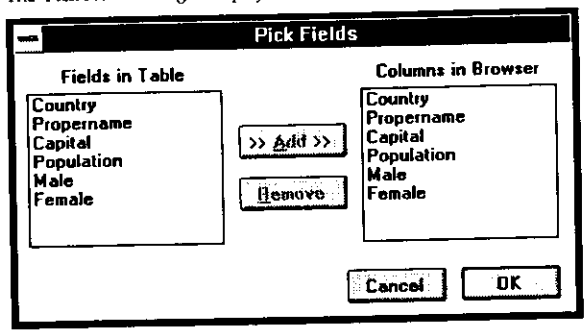
3. Release the mouse button when the column appears in the desired place.

Picking Fields to Add or Remove

The Pick Fields dialog contains a list of all the fields from the underlying table. These fields appear as columns in the Browser.

- Choose Pick Fields from the Browse menu.

The Pick Fields dialog is displayed:



Adding a column to the Browser

1. Choose a field from the Fields in Table box.
2. Click Add.

Removing a column from the Browser

1. Choose a column from the Browser box..
2. Click Remove.

Resizing columns

Resize a column to make it wider or narrower to accommodate the desired amount of text.

To resize a column:

1. Move the cursor to the vertical line to the right of the column heading.

The cursor becomes a four-way arrow.

2. Click and hold the mouse button. Move the mouse left or right to drag the line and make the column larger or smaller. Release the mouse button when the column is the size you want.

Note: This resizing operation is only temporary. It affects the display of fields in Browser columns, but it does not change their width in the underlying table. Workspaces do not save resizing information.

Customizing a Browser

You can customize a Browser by:

- Changing its default font (Style > Pick Font).
- Turning the table's grid (lines) on or off (Browse > Show/Hide Grid).

You can change the font of the text in the Browser through the Font command or Pick Font in the Style menu. The text in the entire Browser changes; you cannot mix fonts in a Browser.

See Also

Pick Font, Show/Hide Grid

Buffer

Menu Path

Edit > Objects > Buffer

Option Enabled If...

A Mapper is the active window, the Mapper has an editable layer, and at least one object is selected in any layer in the Mapper.

Purpose

Buffer allows you to create a buffer polygon around a selected object or objects.

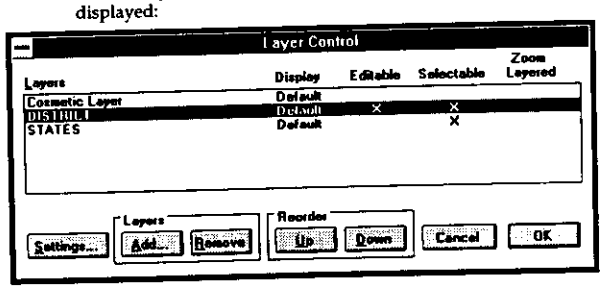
Using Buffer

A Buffer polygon is a polygon around a set of objects. In most cases you want the Buffer polygon to be in a different layer than the objects. To ensure this make the layer for the Buffer polygon editable and the layer for the objects selectable. (When the layer containing the objects is editable, MapInfo places the Buffer polygon into that layer.)

Note: Creating a Buffer is time consuming. The more complex your base objects and the higher the smoothness, the more time it takes to create a Buffer. Points are buffered very quickly. Regions take more time.

To create a Buffer:

1. Open the desired map tables and display them in a Mapper.
2. Choose Layer Control from the Map menu and the Layer Control dialog is displayed:



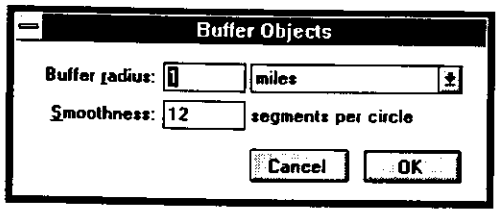
3. Choose the layers you want to specify settings for.
4. Click Settings.

The Cosmetic Layer Settings dialog is displayed when a cosmetic layer is specified. The Map Layer Settings dialog is displayed when a map layer is specified. Set the status of the layer or layers you are working with to editable or selectable. For detailed information on layer settings, refer to the entry on Layer Settings.

The layer where you want to place the Buffer polygon should be editable.

5. Select the object or objects around which you want to create a Buffer.
6. Choose Buffer.

The Buffer Objects dialog is displayed:



7. Type in the size of the Buffer radius, which can be fractional.

The Buffer radius is the distance between the base object (or objects) and the border of the Buffer polygon.

8. Choose the unit you want to use for Buffer radius.from the dialog's menu

The following units are available: inch, foot, yard, mile, millimeter, centimeter, meter, kilometer. The default unit is the distance unit for the Mapper.

9. Type in the smoothness of the Buffer polygon.

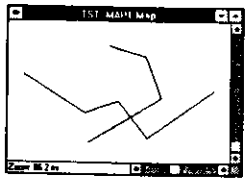
The smoothness determines the resolution of the curves in the Buffer polygon. The default value is 12 segments per circle. More segments produce a smoother curve; fewer segments make a more jagged curve. (See examples below for a more complete explanation.)

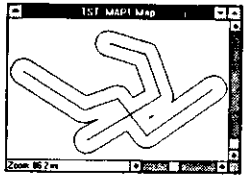
10. Click OK.

The Buffer polygon is placed in the editable layer.

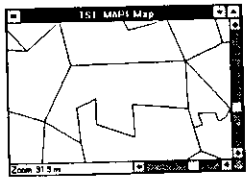
Examples of Buffers

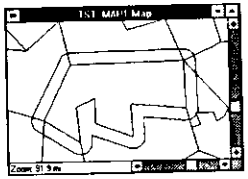
The following examples show how a Buffer is created around two intersecting polylines. The example on the left shows the objects, and the one on the right shows the objects plus the Buffer polygon. At the ends and angles of base lines, the Buffer polygon has circular arcs. The Smoothness option in the Buffer dialog lets you set how smooth these arcs are.



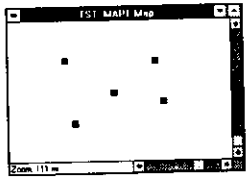


The following examples show how a Buffer is created around a polygon. The base object is the polygon in the middle of the illustration on the left. The Buffer polygon has been added to the illustration on the right. While the base polygon consists entirely of straight lines, the Buffer polygon has curves. The resolution of those curves depends on the smoothness value you set in the Buffer dialog. While this illustration shows a Buffer around a single polygon, you can have more than one polygon in your set of objects.

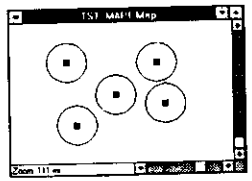


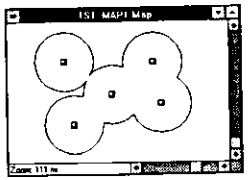


The following example shows five point objects around which we are going to create a Buffer.



The illustration below and to the left shows the Buffer that is created when we set the radius to ten miles. Each point has a circle around it. However, the five circles together count as one region object consisting of five polygons. The illustration below and to the right shows the Buffer that is created when we set the radius at fifteen miles. Now the Buffers around the individual points are large enough to join together.





Calculate Statistics

Menu Path

Analyze > Calculate Statistics

Option Enabled If...

At least one table is open and there is at least one numeric column in that table.

Purpose

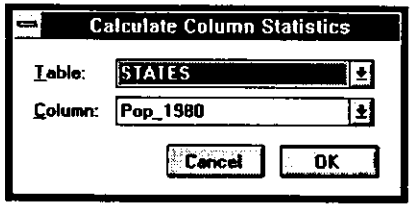
Calculate Statistics allows you to perform statistical calculations for a column in a table (base table or query/selection).

Using Calculate Statistics

To perform statistical calculations for a column:

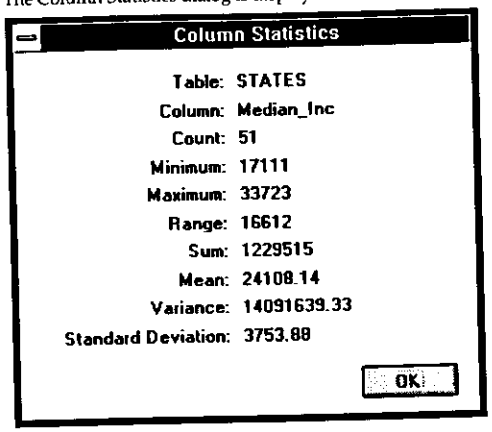
1. Choose Calculate Statistics.

The Calculate Column Statistics dialog is displayed:



2. Choose the table you want to work with from the dialog's Table menu.
3. Choose the column you want to work with from the dialog's Column menu.
4. Click OK.

The Column Statistics dialog is displayed:



Count: The number of records in the table.

Minimum: The smallest value in the column.

Maximum: The largest value in the column.

Range: The difference between the maximum and the minimum value.

Sum: The sum of all values.

Mean: The mean (average) of all values.

Variance: The standard statistical measure of the variance in a distribution.

Standard Deviation: The square root of the variance.

Setting Thematic Ranges by Standard Deviation

You may want to create thematic ranges where each range spans a standard deviation. Use Calculate Statistics to find the mean and standard deviation for your data. Then you can manually set custom ranges. First, find the top and bottom value for each range. When you want an odd number of ranges, the middle range should go from one standard deviation below the mean to one standard deviation above it. For example, when you want three ranges:

Range	Upper Boundary of Range	Lower Boundary in Range
Highest	Maximum	Mean plus one standard deviation
Middle	Mean plus one Standard Deviation	Mean minus one standard deviation
Lowest	Mean minus one Standard Deviation	Minimum

When you want an even number of ranges, then the mean is the boundary between your middle two ranges.

Range	Upper Boundary of Range	Lower Boundary in Range
First (Highest)	Maximum	Mean plus one standard deviation
Second	Mean plus one standard deviation	Mean
Third	Mean	Mean minus one standard deviation
Fourth (Lowest)	Mean minus one standard deviation	Minimum

See Also

Show/Hide Statistics

Cascade Windows

Menu Path

Window > Cascade Windows

Option Enabled If...

At least one of the following is open: Browser, Mapper, Grapher, Layout, MapBasic or Help.

Purpose

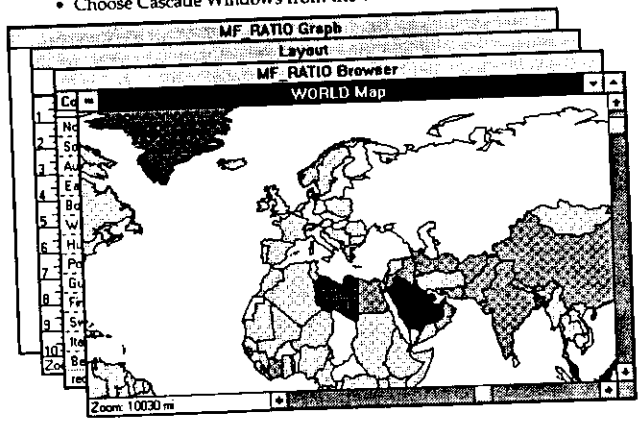
Cascade Windows allows you cascade your windows.

Using Cascade Windows

Choose Cascade Windows to cascade all the windows you are working with. Only the contents of the top-most window is visible. The top-most window is always the active window. To make another window the active window, click on its title bar.

To cascade the windows you are working with:

- Choose Cascade Windows from the Window menu:



See Also

Tile Windows

Change View

Menu Path

Map > Change View

You can also access the Change View dialog by clicking at the bottom left corner of the Mapper.

Option Enabled If ...

A Mapper is the active window.

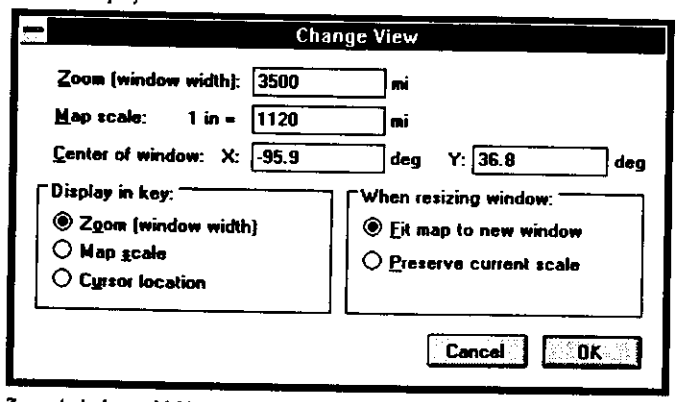
Purpose

Change View allows you to rescale and/or reposition your Mapper.

Using Change View

To rescale or reposition your mapper:

- Choose Change View from the Map menu, and the Change View dialog is displayed:



Zoom (window width): Displays the width of the window. To change the width, type in the desired width.

Map scale: Allows you to specify the distance that one unit represents on the map. What that unit is depends on the Paper & Layout Units preference in System Preference (for more information on specifying units, see the entry Preferences.) The following units are available: inches, centimeters, millimeters, picas, and points.

Center of window: Shows you and allows you to change the X and Y coordinates of the Mapper's center.

Display in key: Determines what is displayed in the map (lower left corner or the Mapper). The choices are:

Zoom (window width): The key shows the horizontal distance in the Mapper.

Map scale: The key displays the map scale.

Cursor location: The key displays the X and Y coordinates of the cursor's location.

When resizing window: Allows you to determine what happens to the map when its Mapper is resized.

Fit map to new window: Retains the same view but at the new size.

Preserve current scale: Preserves the map scale, which means that you see more or less of the map when the Mapper is resized.

See Also

Grabber Tool, Previous View, View Entire Layer, Zoom-in Tool, Zoom-out Tool

Choose Projection

Menu Path

Map > Choose Projection

New > . . . > Projection

Digitizer Setup > Projection

Save As > . . . > Projection

Option Enabled If...

You are creating a new table or saving a current table as another table, and a Mapper is the active window.

Purpose

The Choose Projection option allows you to:

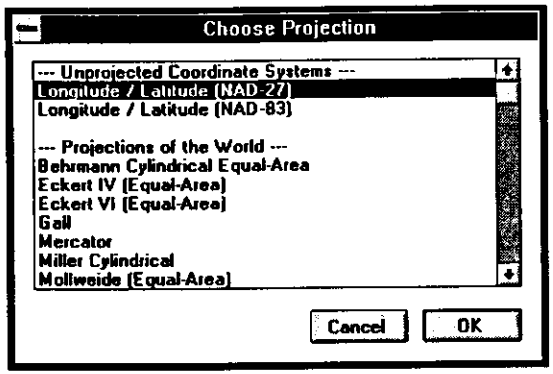
- Display map tables in the projection of your choice.
- Save map tables in the new projection.
- Specify the projection of a paper map that you want to digitize.

Using Choose Projection

1. Choose the map table you want to work with and display it in a Mapper.

Be sure that this Mapper is the active window.

2. Choose the Choose Projection option from the Map menu, and the Choose Projection dialog is displayed:



3. Choose the projection you want from the list.

The projections are organized into the following categories:

- Unprojected Coordinate System
- Projections of the World
- Projections of a Hemisphere
- Projections of the United States
- US State Plane Coordinate Systems (1983)
- US State Plane Coordinate Systems (1927)
- Universal Transverse Mercator

4. Click OK.

The map appears in the specified projection.

Note: It may take a considerable amount of time to display the map in the specified projection. To allow faster display of a projected map, use Save Copy As. The Save Copy As dialog lets you pick which projection the new table (the copy) should use. When you use this new table, the projection is displayed more rapidly.

When you use Choose Projection to change the Map window's projection, the coordinate units change to the native units of the chosen projection.

See Also

For background on projections, see Appendix 5. For information on creating your own coordinate system, see Appendix 7.

Clear

Menu Path

Edit > Clear

Option Enabled If...

A Browser is active. The table must be editable and at least one row must be selected.

A Layout is active. At least one object must be selected.

A Mapper is active. The layer must be editable, at least one object must be selected, and the selected object(s) must not be in Reshape mode. When the selected object(s) is in Reshape mode a node must be selected.

MapBasic window text is selected.

Purpose

Clear allows you to delete the selected text or objects.

Using Clear

When in a Mapper, the object must be edit-selected. (That is, it must be in the editable layer and be selected.) The selection is not placed on the clipboard.

The <BACKSPACE> or <DELETE> key on your keyboard has the same effect as the Clear command. You can use the Undo command immediately after using Clear to reverse the action.

You can also use Clear with the Reshape command to eliminate a single node from an object. Position the Reshape cursor — a small box inside cross-hairs — over the node you wish to eliminate and then click to select it. Now choose Clear from the Edit menu. The node is removed and the graphic object is reshaped.

See Also

Cut

Clear Cosmetic Layer

Menu Path

Map > Clear Cosmetic Layer

Option Enabled If...

An open Mapper is active.

Purpose

Choose this command to clear all objects (graphics, text, and labels) from the cosmetic layer.

See Also

Cosmetic Layer, Save Cosmetic Objects

Clear Objects Only

Menu Path

Edit > Clear Objects Only

Option Enabled If ...

An editable Mapper is the active window and at least one object in the editable layer is selected.

Purpose

Clear Objects Only allows you to remove graphic objects from a table.

Using Clear Objects Only

Clear Objects Only removes graphic objects from the editable table in a Mapper. The tabular data remains.

To remove one or more of the objects in a table:

1. Make the table you are working with the editable layer of the active Mapper.
2. Select the object or objects.
3. Choose Clear Objects Only.

To remove all the objects in a table:

1. Make the table you are working with the editable layer of the active Mapper.
2. Choose Analyze > Select All.
3. Choose Clear Objects Only.

See Also

Modify Structure

Close

Menu Path

File > Close

Option Enabled If...

At least one table is open.

Purpose

Close allows you to close a table when you are finished using it.

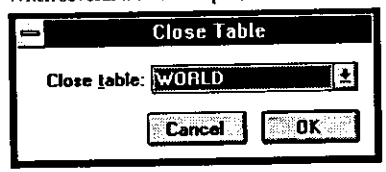
Using Close

When one table is open, the table name appears after the command.

1. Choose Close and the table is closed

or,

When several tables are open, the Close Table dialog is displayed:



2. Choose the table you want to close from the menu in the dialog box.
3. Click OK.

The table is closed along with any window(s) associated with it. When you have a Mapper with several layers you can close one of them without having the Mapper disappear. The table you closed is no longer available in the Mapper.

When closing a table that you are currently editing, you are prompted to save the changes.

When closing a window but not the associated table, click on the Control-menu box [Close box] in the upper-left corner of the window.

Closing Query Tables

When you make selections using Select or SQL Select, MapInfo generates temporary tables. When displayed in windows these tables are named "Query1," "Query2 etc.". These tables can also be closed. However, closing such a table is equivalent to eliminating it.

To save the contents of a Query table, save the table using Save Copy As. You can then close the Query table, effectively deleting it, and later open it under the name of the table you created through Save Copy As.

See Also

Close All

Close All

Menu Path

File > Close All

Option Enabled If...

At least one table is open.

Purpose

Close All allows you to close all open tables and all Mappers, Graphers, Layouts, and Browsers.

Using Close All

To close all tables:

- Choose Close All.

The prompt "Save Changes of Edited Tables?" appears when a table is edited but not yet saved.

See Also

Close

Copy

Menu Path

Edit > Copy

Option Enabled If...

The Browser is active. At least one row must be selected.

The Mapper is active. At least one object from the table must be selected and the selected object(s) is not in Reshape mode.

The Grapher is active. The option is always enabled.

MapBasic window open with text selected.

Purpose

Copy allows you to copy the selected text and/or graphic information and place it in the clipboard.

Using Copy

Before using the Copy command, you may want to specify what is copied to the clipboard. The Copy to Clipboard option (Edit > Preferences> System Preferences) determines what is copied to the clipboard.

To copy only text:

- Choose the TEXT option.

To copy only graphic objects:

- Choose the BITMAP [PICT] option.

To copy both text and graphics:

- Choose both options.

When you do not check one or more of these options, you are able to copy and paste text and graphics from one MapInfo window to another. However, you are not able to use the text or graphics in applications outside of MapInfo.

Note: Text objects created in a Mapper with the Text tool are graphic objects. They are not part of the text you view in a Browser.

See Also

Paste, Merge from Clipboard, Preferences.

Cosmetic Layer

Menu Path

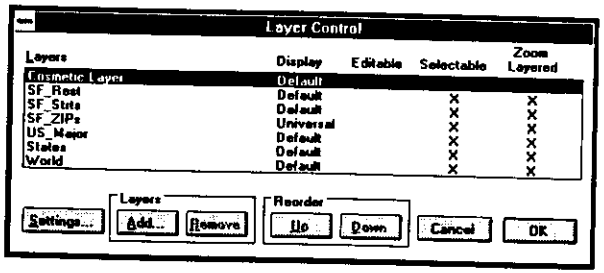
Map > Layer Control > Cosmetic Layer

Option Enabled If...

A Mapper is active.

Purpose

Cosmetic Layer allows you to always have labels and other kinds of map annotation on the top-most map layer.



Using Cosmetic Layer

Each mapper window has a cosmetic layer, which is always the top-most layer. Labels, including automatic labeling are drawn to the cosmetic layer. The following section shows you how to work with cosmetic objects.

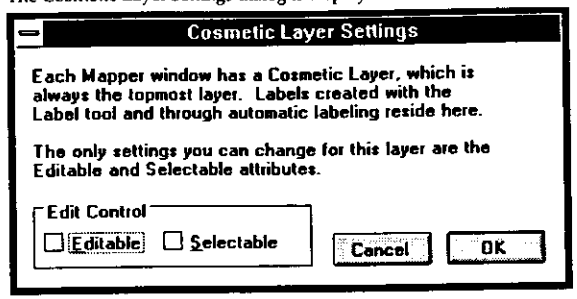
Choosing Editable or Selectable

The cosmetic layer is always the first layer in the Layer Control dialog and the topmost layer in the Mapper. Unlike other layers in the list, you cannot move this layer. The cosmetic layer is editable or selectable, just like other map layers.

To make the cosmetic layer editable or selectable:

1. Choose Cosmetic Layer .
2. Click on Settings.

The Cosmetic Layer Settings dialog is displayed:


Cosmetic Layer Settings
Each Mapper window has a Cosmetic Layer, which is always the topmost layer. Labels created with the Label tool and through automatic labeling reside here.
The only settings you can change for this layer are the Editable and Selectable attributes.
Edit Control
Editable
Selectable
Cancel
OK

Labels and automatic labels are always drawn to the cosmetic layer even when it is not editable. However, to edit labels (move, delete, resize, change fonts) you need to make the cosmetic layer editable.

To perform any editing or drawing functions on the cosmetic layer:

- Choose Editable.

To work with cosmetic objects:

- Choose Selectable.

Saving Cosmetic Objects

The cosmetic layer is NOT saved when you close a Mapper.

To save the cosmetic layer:

- Choose Save Cosmetic Objects from the Map menu.

You can only save objects to an open table. MapInfo prompts you to save the cosmetic objects onto another layer or save the objects to a new table.

To save the objects to an existing layer:

- Choose the layer from the Save Cosmetic Objects dialog menu.

To save the objects in a new table:

- Choose New from the menu of layers.
- Type the new table name in the File Saving dialog.

See Also

Layer Control, Layer Settings, Save Cosmetic Objects

Create Drop Shadows

Menu Path

Layout > Create Drop Shadows

Option Enabled If ...

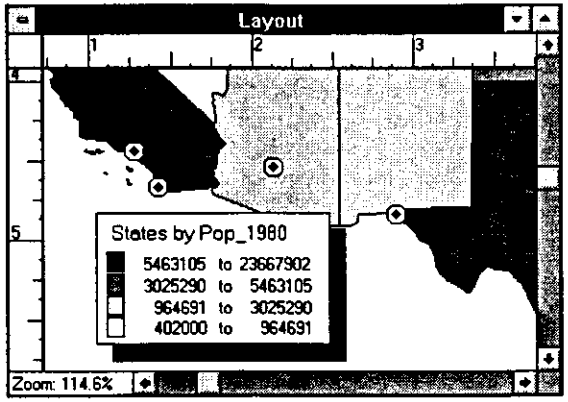
Any Layout objects are selected.

Purpose

Allows you to create drop shadows behind window frames or rectangles.

Using Create Drop Shadows

Drop shadows are rectangles, just like rectangles you create with the rectangle tool. That means that the drop shadow rectangle is not in any way "tied" to its "source" object. When you move or resize that source, the shadow does not resize or move. You create drop shadows for one or more objects at a time. You may not want to create a drop shadow until you are sure of the position of its source. As a general rule, creating drop shadows should be done last.



To create a drop shadow for objects:

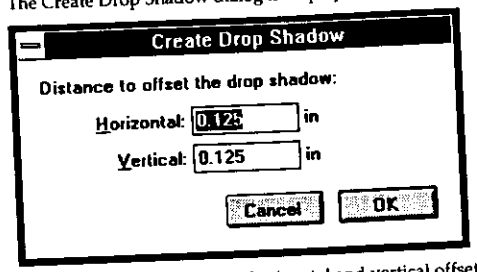
1. Select the object(s) with the Select tool by
   - Clicking on one object

     or,
   - Hold down the <SHIFT > key and clicking on several objects

     or,

   - Choose Select All from the Analyze menu to select all the objects in the layout.
2. Choose Create Drop Shadows from the Layout menu.

The Create Drop Shadow dialog is displayed:



3. Type the size of the horizontal and vertical offset for the drop shadow.

MapInfo has a default offset value of .125 inch. When you change the values, MapInfo retains the changes throughout the session or until you change them again. Offset values should be between 0 and 5 inches.

4. Click OK.

The drop shadow appears behind the selected object(s).

Since a drop shadow is just a rectangle object, you can delete it or change its fill pattern and line style.

Create Points

Menu Path

Table > Create Points

Option Enabled If...

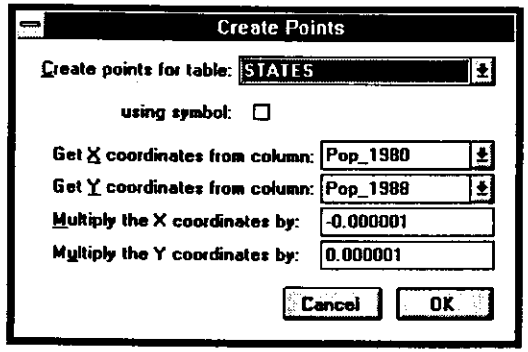
Always

Purpose

Create Points allows you to create point objects for a database that has X and Y coordinates. These points can be displayed on a map.

Using Create Points

Create Points takes X and Y coordinates from each row in a table and creates a point object for each row. It is most useful when you are working with files imported from other databases or when you want to create points for pointfiles used in MapInfo for DOS.



To create points:

1. Click the using symbol icon to activate the Symbol Picker.

The Symbol Picker allows you to choose the symbol that appears on your map.

2. Choose the appropriate column from the Get X coordinates from column menu.

When you are transferring a file from MapInfo for DOS, this is typically called the XCOORD field.

3. Choose the appropriate column from the Get Y coordinates from column menu.

Latitudes measure north-south values. When you are transferring a file from MapInfo for DOS, this is typically called the YCOORD field.

4. Choose a multiplier for each coordinate from the multiply the X coordinates by and multiply the Y coordinates by menu.

The coordinates for the data in MapInfo for DOS pointfiles are in millions of degrees. For example, 87.3 degrees would be represented as 87324691 degrees. This allows MapInfo for DOS to retain a high degree of accuracy without having to deal with floating decimals. Therefore, you should multiply all MapInfo for DOS data by .000001 to convert to degrees. When you are working with data from another GIS system, the multiplier may vary. You can specify a different multiplier for each coordinate.

Coordinates in MapInfo for Windows, Macintosh, Sun, and HP increase up and to the right. Coordinates in MapInfo for DOS increase up and to the left. The default X coordinate multiplier is a negative number to convert between these two systems.

When you are finished choosing a table and X, Y coordinate information:

5. Click OK

When the table has no graphic objects, the coordinates are interpreted as longitude and latitude values. When the table already has graphic objects—some rows already have point objects—the coordinate values are treated as native coordinates in whatever projection the map was saved with.

When you do not have coordinates in your table, you can use Geocode to match some other geographic information (such as street address or ZIP Code) against a table already having graphic objects.

See Also

Geocode

Customize Legend (Graph)

Menu Path

Analyze > Customize Legend

Option Enabled If...

The Grapher is active.

Purpose:

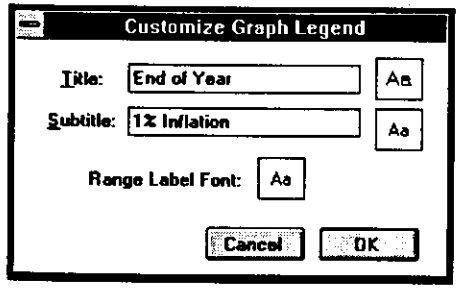
Customize Graph Legend allows you to specify a title and subtitle for your graph and the fonts for the title, subtitle, and range labels.

Using Customize Legend

To customize a graph legend:

1. Choose Customize Legend from the Analyze menu.

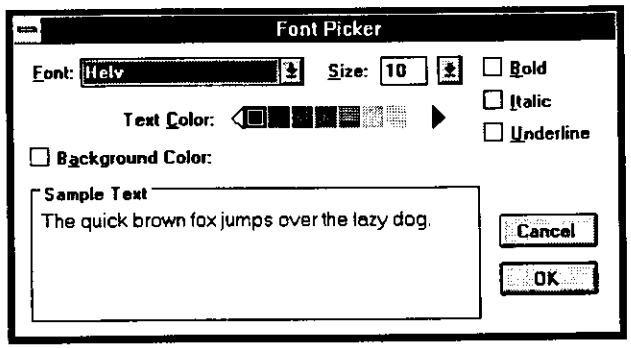
The Customize Graph Legend dialog is displayed:



2. Type a name for your graph in the dialog's Title box.

3. Click on the box to the right of the dialog's Title box.

The Font Picker dialog is displayed:



The Font Picker allows you to choose the style, size, and color of your type for titles and subtitles. For detailed information on how to use this dialog, refer to the Font Picker entry.

When you are finished choosing font specifications.

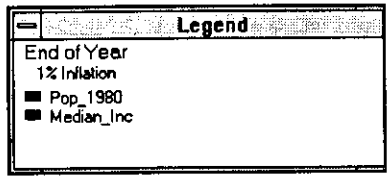
4. Click on OK .

You are returned to the Customize Graph Legend dialog (see page 48).

5. Type other information for your graph in the Customize Graph Legend dialog's Subtitle box.
6. Click on the Range Label Font in the Customize Graph Legend dialog and the Font Picker is displayed as shown above.

The Font Picker allows you to choose the style, size, and color of the type for range labels.

This is how the title and subtitle that was entered in the Custom Graph Legend dialog above would look:



See Also

Font Picker

Customize Legend (Map)

Menu Path

Analyze > Customize Legend

Option Enabled If ...

A Mapper is active and some layer is thematically shaded.

Purpose

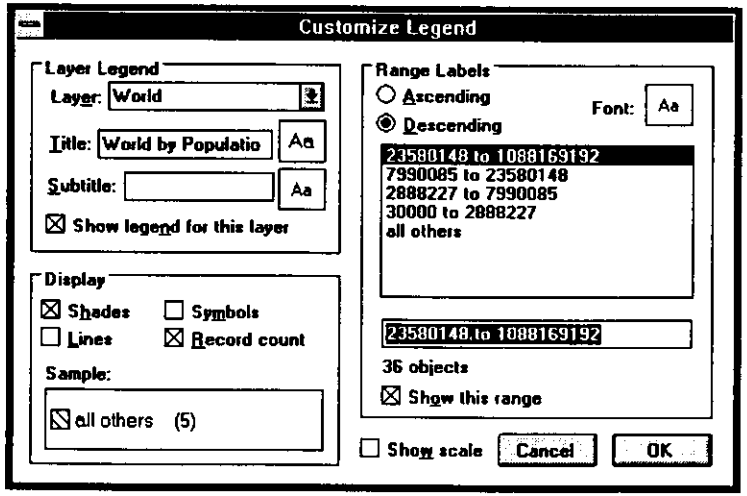
Customize Legend allows you to pick fonts and titles for the legend.

Using Customize Legend

To customize a map legend:

- Choose Customize Legend from the Analyze menu. (This command is only operational when you have done Shade by Value.)

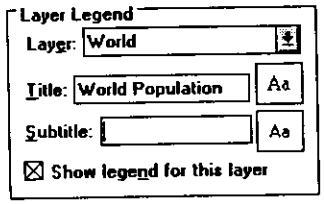
The Customize Legend dialog is displayed:



The Customize Legend dialog is broken up into three dialogs: Layer Legend, Display, and Range Labels.

Specifying the Legend's Layer, Title, and Subtitle

The Layer Legend dialog allows you to choose which layer gets the legend and to give the legend a title and subtitle.



To choose layer legend specifications:

1. Click on the dialog's Layer: menu.
2. Choose which thematically shaded layer in the active Mapper you want to customize.
3. Type a title for your legend in the Title box

As a default, MapInfo titles a legend according to the layer name and the column that was used to compute the thematic ranges (for example, states by Pop_1990). You can type in your own legend title. Legend titles are limited to 32 characters. To change the font, font size, font color, or background color of your legend title, click on the font picker symbol (uppercase and lowercase letter "A"). For detailed information, see the Font Picker entry.

4. Type in your own legend subtitle .

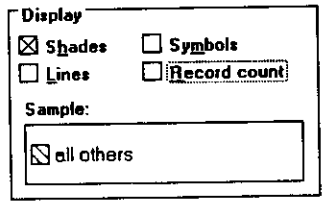
You can change the subtitle font, font size, font color, or background color by clicking on the Font Picker symbol. Legend subtitles are also limited to 32 characters.

You can have only one legend per thematically shaded layer. When you want that layer's legend to appear on the screen:

5. Click the Show legend for this layer box.

Specifying How the Legend Displays Thematic Ranges

The Display dialog allows you to choose how each thematic range is displayed in your legend.



To have a box containing the thematic shade displayed with each thematic range:

- Choose Shades.

To have a line separating the shade box and the record:

- Choose Lines.

When your map is thematically shaded using Individual Values or Range of Values, the color of the line corresponds with the thematic shade associated with that range.

To have the symbol that corresponds with each thematic range displayed:

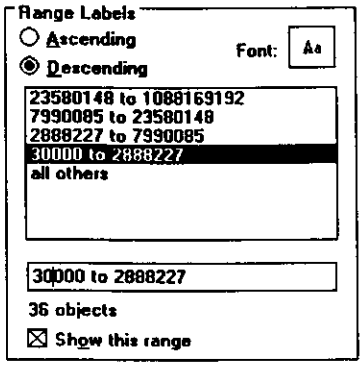
- Choose Symbols.

To have the number of objects that fall within each thematic range displayed in parentheses:

- Choose Record count.

Specifying Thematic Range Values and Display

The Range Labels dialog allows you to specify the minimum and maximum value for each thematic range.



Specify the order that you want the thematic ranges to appear in the legend by choosing Descending or Ascending.

To have the highest value on the bottom of the list:

- Choose Descending.

To have the highest value on the top of the list:

- Choose Ascending.

Note: Ascending and Descending also works with alphabetical characters. Check Ascending, and the thematic ranges are listed in alphabetical order. Check Descending, and the thematic ranges are listed in reverse alphabetical order.

To customize the font, font size, font color, and background color of the range labels. (All range labels must have the same font style.)

- Choose Font.

The Font Picker dialog is displayed (see page 49):

To customize ranges:

- Click on a thematic range from the list of ranges.

The range appears in the box below the range list. MapInfo also displays the number of objects that fall within that range. Use this box to customize the ranges. For example, when your first range contains all customers that have spent between $10,000 and $20,000, you could customize the range label to read "Big Customers" instead of the numeric range.

Note: Changing the ranges in the legend **does not change the ranges in the map**. To combine ranges or create more ranges, you must rerun the Shade by Value command.

To have the selected range appear in the legend:

- Choose Show This Range.

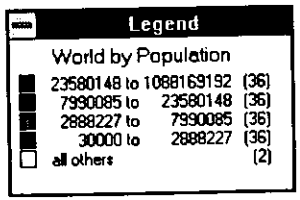
You can set this option for every thematic range. By default, MapInfo checks this option for all ranges except "all others." The "all others" range contains any objects that do not fall within the ranges computed by the Shade by Value command. When no objects fall within the "all others" range, MapInfo does not display this range unless you check the accompanying box.

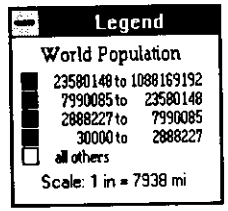
To have the legend contain a distance scale (e.g., 1 inch = 300 miles, 1 cm = 10 km).

- Choose Show Scale.

The legend scale updates automatically when you change the scale of your map.

The illustrations below show a legend before customizing (on the left) and after customizing (on the right).





See Also

Font Picker

Cut

Menu Path

Edit > Cut

Option Enabled If...

A Browser is active, the table is editable, and at least one row is selected.

A Layout is active,and one object in it is selected.

A Mapper is active, the layer is editable, at least one object in the table is selected, and the selected object(s) is not in Reshape mode.

MapBasic window is open with text selected.

Purpose

Cut allows you to remove selected text and objects from a table and places them on the clipboard.

Using Cut

When you cut from a Mapper, Layout, or Browser, MapInfo replaces the current contents of the clipboard, if there are any.

To cut and transfer material from one table to another:

1. Choose the text and/or objects you want cut.
2. Choose Cut to place them on the clipboard.
3. Position the cursor in the table where you want the selected objects inserted.
4. Choose Paste.

Text and/or objects are inserted.

Objects that you are cutting from the Mapper must be edit-selected. Edit handles appear at the corners of the object's bounding rectangle.

When a table is displayed in both a Mapper and a Browser, you can cut an object from the table through the Browser, even when its Mapper layer is not editable.

Setting Preference for Clipboard

What MapInfo does when you cut and transfer information to the clipboard depends on the settings in the Copy to Clipboard option in the System Preferences dialog (which is accessed through Edit > Preferences). To transfer only text, select the TEXT option. To transfer only graphic objects, select the BITMAP [PICT] option. To transfer both text and graphics, select both options.

When there are no objects selected, you are only able to transfer and paste text and graphics from one MapInfo window to another. You cannot use the text or graphics in applications outside of MapInfo.

The clipboard can contain only one item.

Note: Text objects created in a Mapper with the Text tool are graphic objects. These objects are not part of the text you can view in a Browser.

See Also

Paste, Preferences

Delete Table

Menu Path

Table > Delete Table

Option Enabled If ...

At least one table is open.

Purpose

Delete Table allows you to remove a table. All the component files of a table are deleted. For more information on component files in a table, see the MapInfo User's Guide.

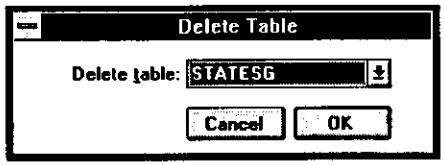
Using Delete Table

Note: When you delete an ASCII, dBASE DBF, Lotus, or Excel file opened in MapInfo, you delete the .TAB file MapInfo created and the original file.

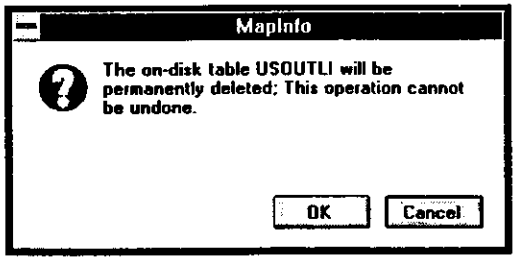
In the Table menu, when only one table is open, the "Name of the Table" appears next to Delete (e.g., Delete World).

1. Choose Delete "Name of the Table" from the Table menu.

When more than one table is open, the Delete Table dialog is displayed:



2. Choose the table you want deleted from the dialog's Delete table menu.
3. Click OK.
4. A warning prompt is displayed:



5. Choose Continue.

The table you specified is deleted.

Digitizer Setup

Menu Path

Map > Digitizer Setup

Option Enabled If ...

A Mapper is the active window and a digitizing tablet is installed.

Purpose

Digitizer Setup allows you to configure MapInfo for digitizing.

Using Digitizer Setup

Before you start digitizing, there is some important background information that you should be familiar with. This information will help you understand the concepts behind digitizing that are necessary to be successful.

Use the Digitizer Setup dialog to:

1. Set the projection of the map being digitized.
2. Create control points.
3. Configure buttons on the digitizer puck.

You should perform these steps in the order listed.

Setting the Projection

When you digitize a paper map, you need to specify the projection used for that map. Most paper maps indicate their projection, generally in the legend. You can use any of the projections MapInfo provides, or you can create your own coordinate system. (See Appendix, Creating Your Own Coordinate System.)

Note: It is very important to set the correct projection **before** you begin digitizing because you cannot fix it afterwards. When you do not correctly specify the projection of your paper map, your digitizing is not accurate.

When digitizing from an aerial photograph, you should generally use the Longitude/Latitude projection.

In order to digitize a non-earth map (e.g., floor plan), the active mapper must be non-earth.

Setting Control Points and Dealing with Error Estimates

Once you have set your projection, you need to set control points. You set control points so that MapInfo knows how to interpret the puck position. To set a control point, you indicate a position on the digitizer tablet by pressing a button on the puck. Then you type in the map coordinates that correspond to that point. MapInfo determines the map values from these coordinates.

You should use at least four control points when digitizing a paper map. When you are digitizing from an aerial photograph, you might want to use thirty or more control points. MapInfo allows you to create as many control points as you need. You do not need to have

the map in any special orientation when you digitize. However, once you start digitizing, you should not move the map for the duration of the session. We recommend that you tape your map firmly to the tablet to make sure it does not move during digitizing.

When you choose four or more control points, MapInfo makes an error calculation estimating the possible error in your setup.

Note: These error values are very important. They are your only indication of whether or not your setup is correct.

When you digitize a map and error values are high, the resulting map table may be too inaccurate for reliable use.

MapInfo makes the error calculation by determining the relative positions of the control points based on the map coordinates you typed in. It can then determine where those points should be on the tablet. The error is the difference between where a point should be on the tablet and where you actually clicked. An error value is displayed for each point.

When you are digitizing from a paper map, these error values should be quite small; they should be on the same scale as the resolution of your digitizer. In most cases errors should be in thousandths or hundredths of an inch. Errors approaching a tenth of an inch are probably too large. When the error is too high, you should:

1. Check the projection to make sure it matches the projection printed on the map. Simply click on Projection in the Digitizer Setup dialog. The Choose Projection dialog displays with the current projection highlighted. If that is not the correct projection, scroll through the list and choose the correct projection.

Once you change the projection, MapInfo recalculates the error.

2. When the problem is not with the projection or when changing the projection only slightly reduces the error, then you have to check individual control points. Start with the points with the highest error. (choose Edit in the Digitizer Setup dialog.) Correct your control points until the error is acceptably small.

When you are digitizing from a photograph, you should use many control points, preferably over twenty. In general, the more control points you use, the smaller the error.

Configuring Digitizer Buttons

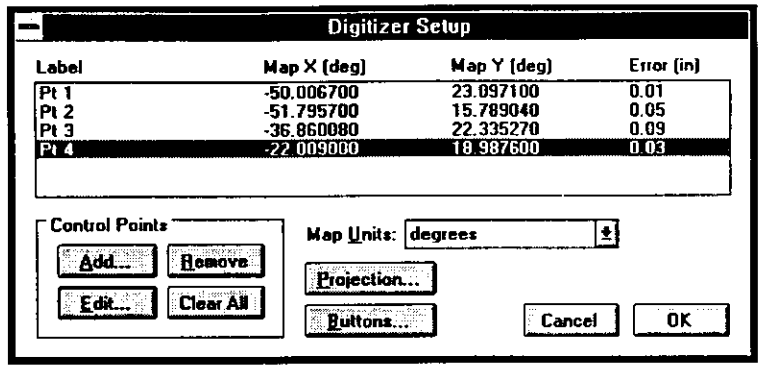
Finally, specify which digitizer button is used to draw and which is used to close polygons and polylines. By default, MapInfo assigns the first function to button one and the second function to button two. You can override the default if you want. Also, you can use one button to serve both functions. In this case, you single-click to specify a point and double-click to complete a polygon or polyline.

Setting Up for Digitizing

To access the Digitizer Setup dialog:

- Choose Digitizer Setup from the Map menu.

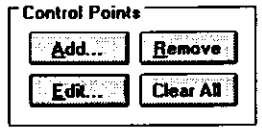
The Digitizer Setup dialog is displayed:



The box at the top of the Digitizer Setup dialog displays a list of control points that you created. The box displays the X and Y coordinates for each point. The coordinates are displayed in the units set with the Map Units menu. The box also indicates the error for each point. The error is specified in paper units (set in Edit > Preferences > System). You need to specify at least four control points for MapInfo to calculate error. When the error for a given point is too large, respecify the point by clicking Edit or double-clicking on the control point.

Working with Control Points

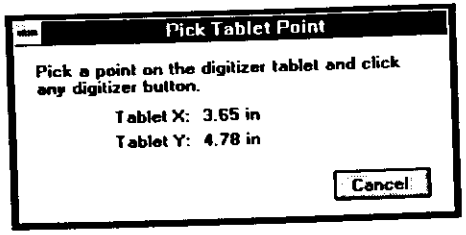
The Control Points box allows you to add a control point, edit a control point, remove a control point, or clear all control points.



Adding Control Points

1. Choose Add.

The Pick Tablet Point dialog is displayed:

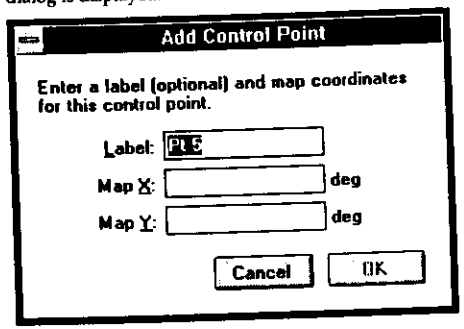

Pick Tablet Point
Pick a point on the digitizer tablet and click any digitizer button.
Tablet X: 3.65 in
Tablet Y: 4.78 in
Cancel

2. Choose a point on the tablet.

As you move the puck around the tablet, the Pick Tablet Point dialog displays where that point is on the tablet. When you click a digitizer button, you select that tablet location as a control point.

3. Click a digitizer button or press <Return> to cancel.

You have selected a point on the digitizer tablet as a control point, and the Add Control Point dialog is displayed:



The Add Control Point dialog allows you to enter a name for the control point (optional) and X, Y coordinates.

4. Type a name for the control point in the Label box.

MapInfo supplies default names, "Pt 1","Pt 2", etc. You can use labels to help remember where each control point is located on your map.

5. Type the coordinate values for the point in Map X and Map Y.

When you have chosen degrees as the map unit, **be sure to type the coordinate values in decimal degrees.** Most paper maps specify longitude and latitude in degrees, minutes, and seconds. Appendix 4 explains how to convert to decimal degrees.

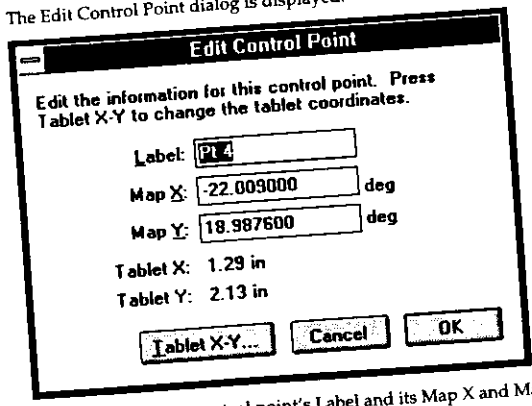
6. Click OK.

Editing a Control Point

If you make a mistake when entering a control point, you can edit it. High error values are often an indication that such a mistake was made.

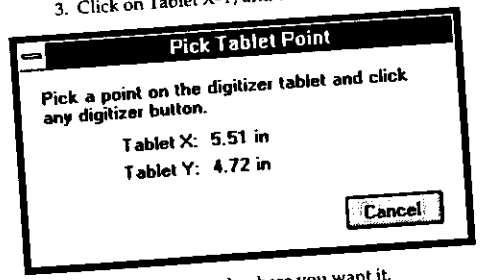
1. Choose the point from the list in the Digitizer Setup dialog.
2. Click on Edit.

The Edit Control Point dialog is displayed:


Edit Control Point
Edit the information for this control point. Press Tablet X-Y to change the tablet coordinates.
Label: Pt 4
Map X: -22.009000 deg
Map Y: 18.987600 deg
Tablet X: 1.29 in
Tablet Y: 2.13 in
Tablet X-Y...
Cancel
OK

You can change the control point's Label and its Map X and Map Y points. Simply type new values. You may want to change the tablet position for a control point.

3. Click on Tablet X-Y, and the Pick Table Point dialog is displayed:


Pick Tablet Point
Pick a point on the digitizer tablet and click any digitizer button.
Tablet X: 5.51 in
Tablet Y: 4.72 in
Cancel

Position the digitizer puck where you want it.

4. Click any button.

Removing a Control Point

To remove a control point.

- Choose the point from the list in the Digitizer Setup dialog.
- Choose Remove.

The control point is removed.

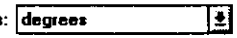
Clearing All Control Points

All control points are removed and the projection is reset to the projection of the active mapper.

- Choose Clear All

Specifying Map Units

The Map Units menu allows you to specify a value from a list of map units.



- Click on the Map Units menu.

A list of units is displayed. "Degrees" is always available for earth maps. Depending on the projection you are using, another unit, the native unit for that projection, may be available. When digitizing a non-earth map, you have a wider range of values.

- Choose the unit that matches the coordinate units on your paper map.

When the desired unit is not in the list, check to make sure you specified the correct projection.

Note: In order to digitize a non-earth map, the active Mapper must also be non-earth.

Accessing the Projection and Buttons Dialog

Projection and Buttons allow you to access their respective dialogs.

- Click on Projection

The Choose Projection dialog is displayed. Use this dialog to select the projection (See the entry on Choose Projection.) of the paper map.

- Click on Buttons

The Set Digitizer Buttons dialog is displayed. (See below.)

Implementing or Canceling Your Setup

From the Set Digitizer Buttons dialog:

- Click OK.

The Digitizer Setup you have specified is implemented.

- Choose Cancel.

The work you have done in Digitizer Setup is canceled.

Setting Digitizer Buttons

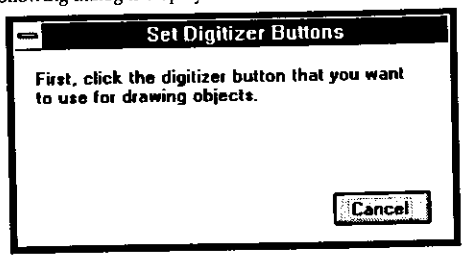
The digitizer button is used to enter a point when you are drawing an object and to complete a polyline or polygon.

If your digitizer puck has only one button, you must use it for both of these functions. In that case a single-click enters a point when you are drawing an object. A double-click completes a polyline or polygon.

If you have two or more buttons on your digitizer puck, you can designate which button performs each function.

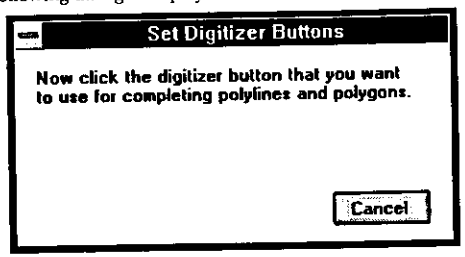
1. Choose the Buttons button from the Digitizer setup dialog..

The following dialog is displayed:



2. Click the button you want to use for drawing objects.

The following dialog is displayed:


Set Digitizer Buttons
Now click the digitizer button that you want to use for completing polylines and polygons.
Cancel

3. Click the button you want to use for completing polylines and polygons.

Your digitizer puck is now configured to your specifications.

Display Options

Menu Path

Layout > Display Options

Option Enabled If ...

A Layout window is active.

Purpose

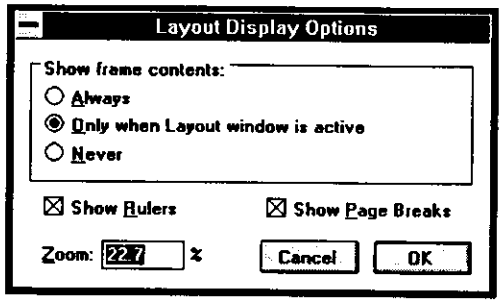
Display Options allows you to specify how window frames are displayed in a Layout window and how the Layout window is displayed.

Using Display Options

You must first access the Layout Display Options dialog.

1. Choose Display Options from the Layout menu.

The Layout Display Options dialog is displayed:



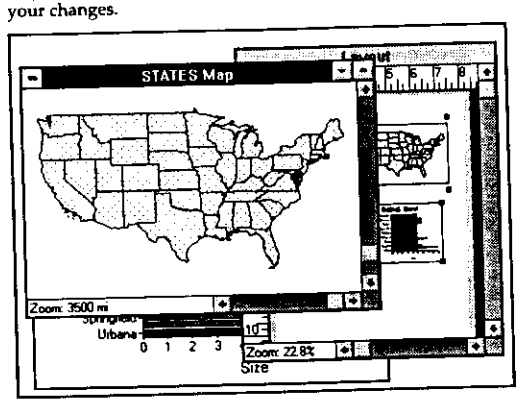
The options in the Show frame contents box allow you to specify when the contents of frames are displayed.

Display Frame Contents Always

To have the contents of a frame display all the time even when it is not active:

2. Choose Always

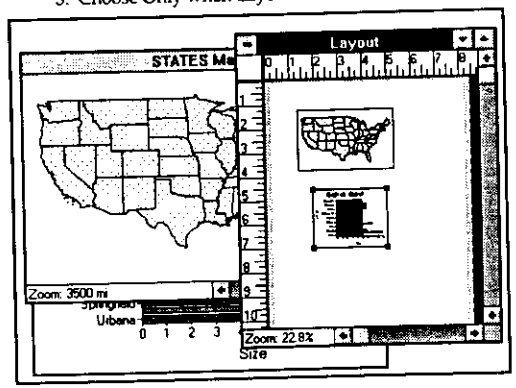
For example, if you are changing the contents of a Mapper what is also in the layout, you might want the Always option. That way you can see the effect of the layout as you make your changes.



Display Contents Only When Layout Window is Active

To display the contents of a frame only when it is the active window:

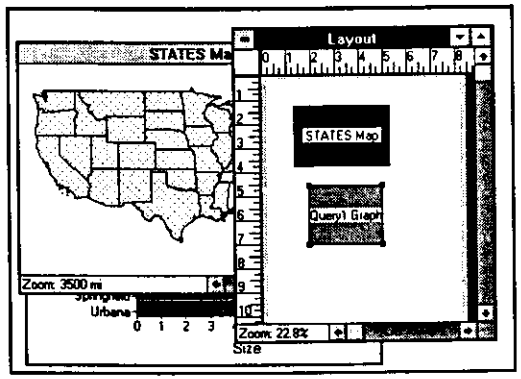
3. Choose Only when Layout window is active.



Display Only File Name and Type

To display only the file name and frame type, even when the Layout is the active window:

4. Choose Never.



For example, choose Never when you are resizing and repositioning frames. That way the contents of each frame will not redraw every time you work on something.

☒ **Show Rulers**

5. Choose Show Rulers to display rulers along the left side and top of the layout.

☒ **Show Page Breaks**

6. Choose Show Page Breaks to have dotted lines appear in multi-page layouts to indicate page breaks..

Current Zoom: 33.3333

7. Choose Zoom to display the magnification factor at which the Layout is currently being displayed.

You can change the zoom by typing a new value in the Zoom box on the Display Options dialog or by using the View Actual Size, View Full Layout, or Previous View options on the Layout menu.

For example, when the zoom is 25%, that means the contents of the current Layout is being displayed at 25% of its actual size.

Note: The zoom is displayed at the lower left of the Layout window. When you click on that area, MapInfo displays the Display Options dialog for that Layout.

See Also

For information on how to change the display of individual frames, see the discussion of the Window Frame Object dialog in the entry on the Frame tool.

Draw Autolabels

Menu Path

Map > Draw Autolabels

Option Enabled If ...

A Mapper is the active window.

Purpose

Draw Autolabels allows you to label objects according to preferences set in the Labels area of the Settings dialog Layer Control .

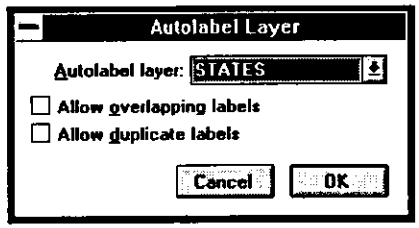
Note: You must set these preferences for each layer.

Using Draw Autolabels

To access the Autolabel Layer dialog.

1. Choose Draw Autolabels from the Map menu.

The Autolabel Layer dialog is displayed:



2. Choose the layer you want labeled from the dialog's Autolabel Layer menu.

Label All Layers

3. Choose All Layers from the dialog's Autolabel Layer menu.

Label a Selection

If you have made a selection in the Mapper, you can pick Selection from the dialog's Autolabel layer menu to label only those items.

4. Choose Selection.

Allow Labels to Overlap

To allow labels to overlap also label all objects (and move overlapping labels later):

5. Choose Allow overlapping Labels.

Duplicating Labels

To allow you to place the same label on a map more than once:

6. Choose Allow duplicate labels.

MapInfo looks at the labels that are in the cosmetic layer to determine what overlapping or duplicate labels exist.

Deleting Individual Labels

To delete individual labels:

1. Set the Cosmetic Layer to editable (Settings, in Layer Control).
2. Select the label and Choose Clear from the Edit menu, or press the <DELETE> key.

Deleting All Labels

To delete all labels:

- Choose Clear Cosmetic Layer from the Map menu.

All labels and anything else in the cosmetic layer is deleted.

See Also

Layer Settings

Edit (Browser)

Menu Path

Window > Browse > Edit

Option Enabled If...

A Browser is the active window.

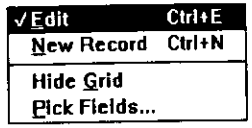
Purpose

Edit allows you to make changes to a table.

Using Edit

To edit a table:

- Choose Edit from the Browse menu.



The cursor becomes an I-beam when you move it over the Browser. You can add and delete text or cut and paste to and from the clipboard.

You can also make a table editable by clicking on a Browser record with the Text tool.

See Also

Text tool

Ellipse Tool

Menu Path

Tool Palette

Tool Enabled If...

A Layout or an editable Mapper is active.

Purpose

Edit allows you to make changes to a table and specify ellipse attributes.

Using the Ellipse Tool

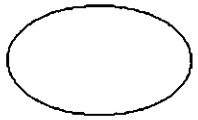
To draw an ellipse:

1. Choose the Ellipse tool from the Tool palette.
2. Move the pointer to where you want to begin creating the ellipse.
3. Hold the <SHIFT> key down while using the Ellipse tool.
4. Press and hold down the mouse button.
5. Move the pointer.

The shape appears on the screen in a dotted outline and changes size and proportion as you move the pointer.

6. Release the mouse button when the ellipse has the shape you want.

The ellipse appears in the current line and fill style.



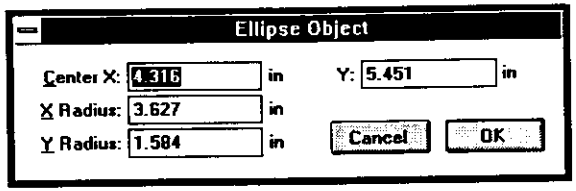
Line and fill are set with the Pick Fill and Pick Line options or with the Line+Fill Picker dialog on the Style menu.

Setting Ellipse Attributes

To set the center, horizontal, and vertical coordinates of an ellipse:

1. Click or double-click on the edge of the ellipse.

The Ellipse Object dialog is displayed.



2. Type the coordinate settings for the ellipse in the dialog 's coordinate settings boxes.

Center X and Y: The X-Y coordinates of the ellipse's center.

X Radius: The horizontal distance from the center of the ellipse to the rightmost (or leftmost) point.

Y Radius: The vertical distance from the center of the ellipse to the topmost (or bottommost) point.

See Also

Pick Fill, Pick Line, and Line+Fill Picker

Exit [Quit]

Menu Path

File > Exit [Quit]

Option Enabled If ...

Always.

Purpose

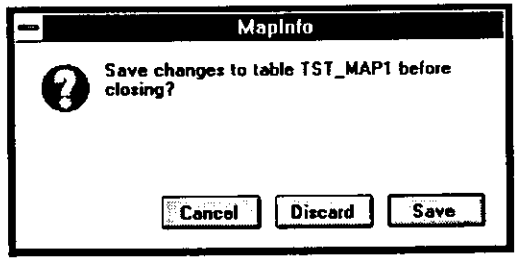
Exit [Quit] allows you to exit MapInfo.

Using Exit [Quit]

To exit (quit) MapInfo:

- Choose Exit [Quit] from the File menu.

If you made changes to a table(s) and did not save them the following prompt appears:



Unless you choose Save, the changes are lost.

Export

Menu Path

Table > Export

Option Enabled If...

A table is open.

Purpose

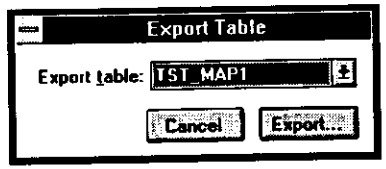
Export allows you to export graphics and tabular data to MapInfo format (MIF) and AutoCAD DXF files. Only tabular data can be exported to delimited ASCII and dBASE DBF format.

Using Export

To export a file:

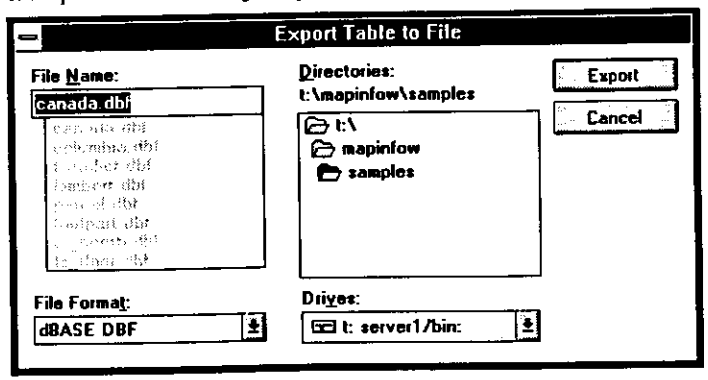
1. Choose Export from the Table menu.

When more than one table is open, the Export Table dialog is displayed:



2. Choose a table to export.

The Export Table to File dialog is displayed:



3. Click on the folder icons and choose a directory/folder to put the exported file in.

The path and directory/folder that the file is exported to is displayed under Directories.

4. Type a name for the file in the box under File Name.
5. Click on the File Format menu and choose the file format you want the file saved as.

The File Format menu lists the following options:

- MapInfo Interchange
- Delimited ASCII
- AutoCAD DXF
- dBASE DBF

MapInfo Interchange is the default. For more information on these options, see below.

6. Click OK.

The file is exported in the export format specified.

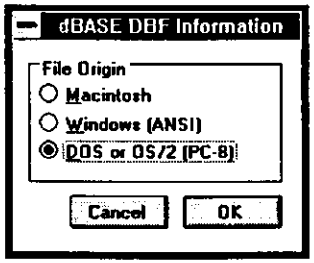
MIF Export

MapInfo Interchange Format (MIF) is an ASCII file format that can fully describe a MapInfo database. Both graphic and tabular data are exported into MIF files. The graphic data is in a file with a " .MIF " extension, and the tabular data is in a file with an ".MID" extension. MapInfo Interchange Format files can be translated into other formats with other programs. The MapInfo Interchange Format is fully described in Appendix 1.

dBASE DBF Export

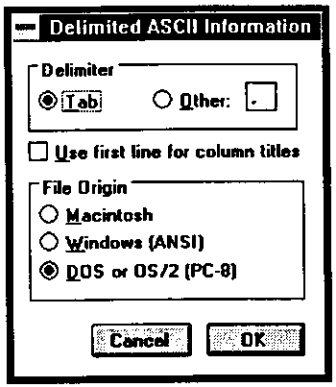
MapInfo can export tabular data into dBASE/FoxBASE DBF format. When you save your table in DBF format, you create a .DBF file, as well as some other files. These other files contain graphic information (i.e., MapInfo indices and other information that MapInfo uses). Exporting to DBF creates only the .DBF file. No graphical data is exported to dBASE.

MapInfo also displays the dBASE DBF Information dialog that you use to indicate the character set for the exported DBF file. Different platforms use different character sets. MapInfo must know the platform where you are going to use the export in order to use the appropriate character set.



ASCII Export

MapInfo also allows you to export your tabular data to a delimited ASCII file. This file can later be edited with a text editor or imported into another package. When you export to ASCII, MapInfo displays the Delimited ASCII Information dialog, where you choose your delimiter character.



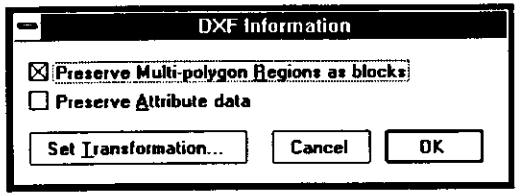
You can also choose to have the first row of the ASCII file become column titles.

MapInfo also displays a dialog that you use to indicate the character set for the exported ASCII file. Different platforms use different character sets. MapInfo must know the platform where you are going to use the export in order to use the appropriate character set.

No graphical data is exported to ASCII.

AutoCAD DXF Export

After you have selected a table to export and specified the AutoCAD DXF format, the DXF Information dialog is displayed:



Preserve Multi-Polygon Regions As Blocks: Choosing this box creates a block for every region in your map that contains multi-polygons.

Preserve Attribute Data: Choosing this box exports tabular information into your database in the form of DXF attributes.

Set Transformation: Choose this button to specify a custom coordinate transformation. If you do not set a coordinate transformation, the coordinates in your DXF file are the native

projection for the map (i.e., longitude-latitude, Lambert Equal Area, any of the State Plane systems, or any other MapInfo projection).

It is not necessary to set a coordinate transformation when exporting. However, you need to set a coordinate transformation in the following situations:

- When you work with the map in a coordinate system not supported by MapInfo.
- When you are going to work with the map in a system whose coordinates are geographically meaningless. For example, if you are going to work in a drawing or illustration package, the package's coordinates have no relation to the earth coordinates of your map.

MapInfo Objects as DXF Entities

MapInfo objects become DXF entities as follows:

MapInfo object	DXF Entity
single-polygon region	closed polyline
multi-polygon region	block containing closed polylines; the block is named REGION0, REGION1, etc.
circular arcs	arc
non-circular arcs	scaled block containing the arc; the block is named ARC0, ARC1, etc.
rectangle	closed polyline
rounded rectangle	closed polyline (roundness is lost)
circular ellipse	circle
non-circular ellipse	scaled instance of a block containing an ellipse; the block is named ELLIPSE
text	underlined text is handled by prefixing a %%u code
line	line
point	point
polyline	polyline

All MapInfo colors are translated to the closest primary colors in DXF (red, yellow, green, cyan, blue, magenta, and white).

All lines are converted to continuous, dashed, or dot-line types.

Rotated text is not supported in DXF. Fonts are not preserved, and all text is exported into the AutoCAD STANDARD font.

When attribute data is preserved, a block is created for every object. The blocks are named BLK0, BLK1, BLK2, etc. The attributes inside the blocks are given the same names as the field names in the database.

Exporting a Map in a Different Projection

You may want to export a map in a projection that is different from its native projection.

You must first create a copy of your table.

1. Choose File > Save Copy As.

Specify a new projection for your copy.

2. Choose the Projection option in the Save Copy of Table dialog .
3. Choose Export from the Table menu.

Follow the instructions for exporting a file.

Export Window

Menu Path

Window > Export Window

Option Enabled If...

At least one of the following is open: Browser, Mapper, Grapher, or Layout.

Purpose

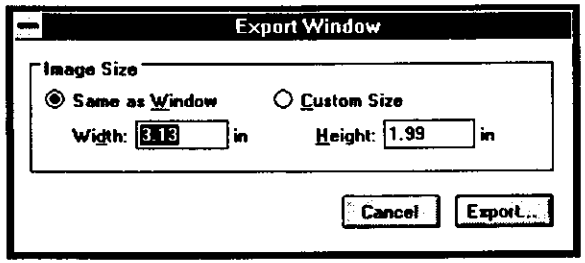
Export Window allows you to capture the active window and save it as a bitmap (.BMP) or a Windows metafile (.WMF) from MapInfo for Windows, or as a PICT file from MapInfo for the Macintosh. You can then use the exported file with other applications on those platforms.

Using Export Window

To access the Export Windoe dialog:

1. Choose Export Window.

The Export Window dialog is displayed:

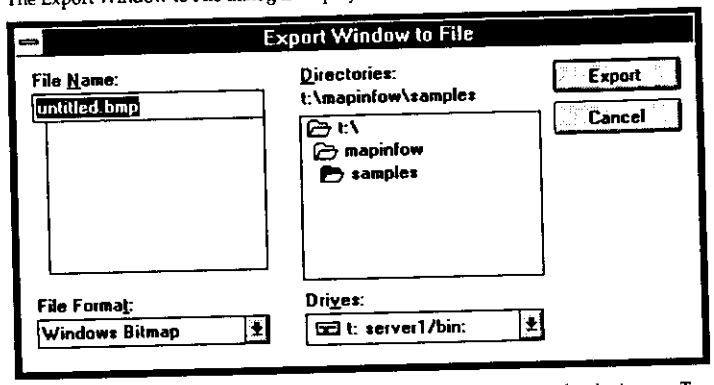


The Export Window dialog allows you to specify the output image size. When you choose Same as Window (the default), MapInfo outputs the image at the size it has in its window. When you want to make the image larger or smaller, scale the image by entering the width or height in the Custom Size box. Once the image is exported, you cannot change its proportions. When you change either the height or the width, MapInfo changes the other dimension to preserve the image's proportions.

When you are satisfied with the image size:

2. Click on Export.

The Export Window to File dialog is displayed:



The Export Window to File dialog allows you to specify a file name for the image. Type in a file name. You can also choose a directory (Windows) or a folder (Macintosh) where you want to save the image.

If you are in MapInfo for Windows, you can also choose the file format for the exported image. Bitmap (.BMP) is the default format. You can choose Windows metafile (.WMF) from the dialog's File format menu (bottom-left corner of dialog).

3. Click on Export.

MapInfo places the image in the file or folder that you specified.

WMF's and PICT's in Other Applications

Windows metafiles and PICTs are complex images. The way they behave in other applications depends on those applications. One thing that varies is the way the images are clipped (cropped).

When MapInfo exports a window, it does not clip objects that extend beyond the edges of the windows; but it does export information about where the clipping is. For example, if you are exporting a Mapper that displays part of Germany, but not all of it, the exported file (PICT or WMF) contains the entire image of Germany. It also contains information about where MapInfo clipped that image in its Mapper. But when you open the exported window in your target application—a drawing package for example—the image of Germany may not be clipped. You need to experiment a bit to find out what happens.

Expression

Menu Path

Analyze > Select > Assist

Table > Update Column > Expression

Analyze > Shade by Value > Expression

Map > Layer Control > Layer Settings > Label with column > Expression

Option Enabled If ...

A table is open and you are in any of the following dialogs: Select, Update Column, Shade by Value, or Layer Settings.

Purpose

Expression allows you to use features for creating logical expressions.

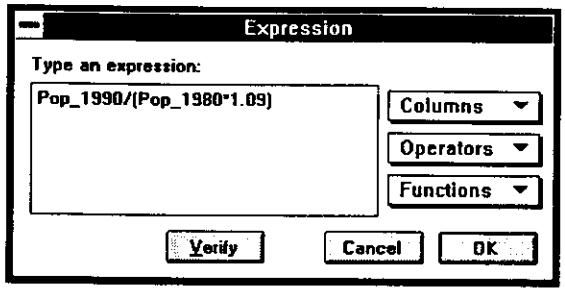
Using Expression

Use the Expression dialog to formulate mathematical and alphanumeric expressions in several MapInfo dialogs.

To access the Expression dialog:

- Choose Expression from the appropriate menu or dialog.

The Expression dialog is displayed:



Expressions consist of column names (i.e. record fields), operators ("+", "-", "and", "or", etc.), functions (Area, Sin, Year, etc.) and values, (i.e. 2367, 45.0993, New York, Main St). You type expressions directly into the dialog box or choose them from the dialog menus. When you use a dialog menu, MapInfo inserts the element into the expression at the cursor.

Specifying Expression Parameters

Type An Expression: You can type your expression directly into this box.

Columns: Choose a column (field).

Operators: Choose an operator. The operators are listed in the section on Operators, page **Error! Bookmark not defined.**. For examples, see Appendix 6, Creating Expressions.

Functions: Functions have zero or more parameters and return a value. The returned value may be used in an expression, such as another function. For examples of using these operators, see Appendix 6, Creating Expressions.

Cancel: Cancels the expression and removes the dialog.

OK: Enters the expression and returns you to the dialog you started from (Select, Shade by Value, Update Column, or Layer Settings).

Verify: Checks the syntax of the query and tells you whether it is correct.

Where Expressions Can Be Used

Expressions are used in the following commands: Select, SQL Select, Update Column, Shade by Value, and Layer Control (the Label With Column box in the Settings dialog). The expression serves a different purpose in different commands.

For example:

- In the Select command and in the Where Condition statement of SQL Select, the expression states a condition that a record in a table must meet in order to be included in a query table.
- In Update Column and in Select Columns in SQL Select, the expression calculates a value that is then entered into a table.
- In Shade by Value, the expression calculates a value that is then displayed on a map.
- In Label With Column, you use expressions containing string functions to fine tune your labels.

The expressions fall into two broad categories:

1. Expressions that must evaluate to true or false.
2. Expressions that simply calculate some value.

Expressions which must evaluate to true or false always have a comparison operator and may have multiple clauses connected by logical operators. Use these expressions for selecting objects in Select, or the Where Condition of SQL Select.

Expressions which simply calculate some value never have a comparison operator and generally do not have multiple clauses. Use these expressions to calculate values for Shade by Value, Update Column, derived columns in SQL Select, and Label With Column in Layer Settings.

Entering Specific Values (Constants) Into Expressions

When entering specific character strings, numbers, and dates into expressions, you need to observe the following conventions.

Character Strings

When typing a particular string into an expression you must enclose it in double quotes. MapInfo then treats it as a string rather than as a column name. For example, strings 1 and 2 shown below are valid string constants, while 3 and 4 are not.

(1.) `"Orange"`
(2.) `"New York"`
(3.) `Orange`
(4.) `New York`

Numbers

When entering specific numerical values, do not use commas, dollar signs, or any characters other than numerals, decimal points, and the minus sign for negative numbers.

Dates

Dates consist of a month, a day, and an optional year. The year is specified by two or four digits and enclosed in double quotes. The components of a date are separated by hyphens or slashes. The following are valid data constants:

(5.) `"1-20-92"`
(6.) `"01/20/1992"`
(7.) `"1/20"`

Mathematical operators:

The fourth column shows how the operators handle different data types.

+	plus	A + B	Date + Number —> Date *some number + some number* —> FloatNumber + Date —> Date *some integer + some integer* —> Integer
-	minus	A - B (subtraction) -A (negative)	Date - Number —> Date Number - Date —> Date *some integer - some integer* —> Integer *some number - some number* —> Float
*	times	A * B	*some integer* **some integer* —> Integer *some number * some number* —> Float
/	divided by	A / B	*some number / some number* —> Float
^	exponentiation	A ^ B	*some number ^ some number* —> Float

The following calculations are possible:

- Adding numbers to dates to yield another date
- Subtracting a number from a date to yield another date
- Subtracting a date from a date to yield a number

When you add numbers to dates or subtract numbers from dates, MapInfo treats the numbers as specifying a number of days. When you add or subtract a week, you use the number 7. When you add or subtract a month, you use 30 or 31. When MapInfo subtracts a date from a date, the resulting number indicates a number of days.

String operator:

+	"concatenation" — connects strings and string expressions.

Strings must be enclosed in double quotes. For example:

```
"Ms. " + Last_Name
```

When MapInfo evaluates this as part of an expression, it places "Ms. " in front of each last name. The string constant ("Ms. ") is in quotes. Similarly,

```
"Hello, " + "world"
```

gives you "Hello, world."

Comparison operators:

=	"equals"
<>	"not equal"
>	"greater than"
<	"less than"
>=	"greater than or equal to"
<=	"less than or equal to"

Logical operators:

"And", "or", and "not" are logical operators. They are used to combine expressions in Select and the Where Condition clause of SQL Select. MapInfo treats these expressions as a test that it applies to each record in the table. For each test it gets a yes/no (true/false) answer. MapInfo uses the logical operators to tell it how to combine the individual yes/no answers into an overall yes/no answer: Does the current record meet the selection condition?

and	is "true" when (and only when) both of its arguments (the expressions it joins together) are true. A record must satisfy both of these conditions to be selected.
or	is "true" when either one, or both, of its arguments (the expressions it joins together) are true. A record need satisfy only one of these conditions to be selected. It is also selected when both of its conditions are satisfied.
not	is "true" when its argument (the expression it applies to) is false. A record is selected when it does not meet the stated condition.

Keywords

MapInfo supports the use of the keywords "any", "all", "in" and "between". These keywords must be typed into expressions.

Use "any" to select any item in a set of items.

```
ABBR = any("AL", "MN", "TX")
```

Any is true of any record where the state is Alabama, Minnesota, or Texas.

To understand the use of "all" consider this expression:

```
ABBR <> all("AL", "MN", "TX")
```

This statement says: Give me all orders where the state does not equal Alabama, Minnesota, or Texas. It selects all orders except those from Alabama, Minnesota or Texas. Consider what happens when we issue the following:

```
ABBR <> any("AL", "MN", "TX")
```

The following example shows the use of "in":

```
ABBR in("AL", "MN", "TX")
```

In this case "in" is equivalent to "=any" and "not in" is equivalent to "<>all".

Finally, consider these two examples which illustrate "between":

```
PRICE between 50000 and 100000
(PRICE between 50000 and 100000) or (PRICE between 150000 and
 200000)
```

Operator Precedence

When MapInfo evaluates expressions, it needs to know which components of an expression to evaluate first. This is called precedence. By convention, certain operators are assigned different levels of precedence. Those with the highest level are evaluated first. The following table lists MapInfo's operators in the order in which they are evaluated. Operators at the same level of precedence are evaluated from left to right.

Highest Priority:	parenthesis
	exponentiation
	negation
	multiplication, division
	addition, subtraction
	geographic operators, comparison operators
	Not
	And
Lowest Priority:	Or

Find

Menu Path

Analyze > Find

Option Enabled If ...

The table you are using meets all of the following requirements:

- Has an indexed field.
- Is mappable (graphic objects must be attached to the records).
- Appears in either a Mapper or Browser (the Mapper or Browser does not have to be the active window).

Purpose

Find allows you to locate individual objects. When MapInfo locates an object, it marks it with a symbol.

Using Find

Find operates in two ways:

- When you issue the Find command for the first time in a session, the Find dialog is displayed that allows you to define your search. When you have defined your search, another dialog is displayed that allows you to specify what data to look for.
- If you have previously used the Find command in your session, you only need to specify what data to look for. This allows you to quickly find more objects from the same layer/table. When you want to find objects from another layer/table, choose Respecify in the second dialog.

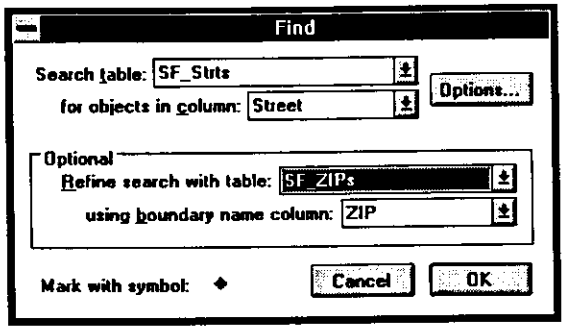
If the "found" object is not on the current Mapper window, MapInfo positions the object in the middle of the Mapper window and designates the object with a symbol that you select in the Find dialog. When the object is on the current Mapper window, the contents of the Mapper does not move, but MapInfo still designates the object with a symbol. When you are working with a Browser, MapInfo scrolls through the Browser until the designated object is the first record in the window.

Accessing the Find Dialog

To access the Find dialog.

- Choose Find from the Analyze menu.

The Find dialog is displayed:



Specifying Find Parameters in First Dialog

Search table: Choose a table to search from this menu.

For objects in column: Choose the objects you are looking for from this menu.

Options: Click on Options to display the Find Options dialog (described below).

Mark with symbol: Click on the symbol to activate the Symbol Picker. Choose the symbol you want and designate its point size and color.

Refining Your Search

Use the Refine option when you are trying to find an object or address whose name is used for other objects. For example, when you are searching for the city of Rochester, do you want Rochester, New York or Rochester, Minnesota? Refine your search by selecting another column (from another table). Refining the search by states allows you to specify the state for each city, rather than just the city name. This refining table must contain regions, such as states, counties, town boundaries, or census tracts.

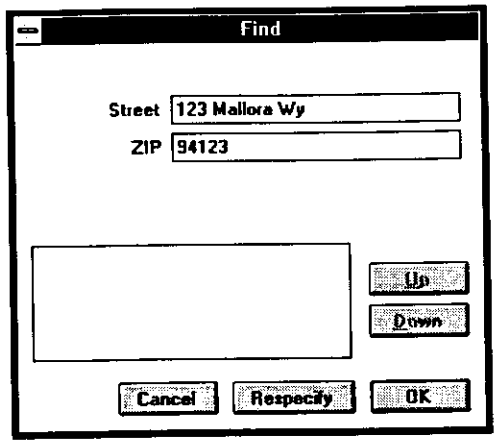
From the Refine search with table menu:

- Choose a "refining" table.

From the using boundary name column menu:

- Choose your "refining" column.
- Click OK.

The second Find dialog is displayed:



Specifying Find Parameters in Second Dialog

Use this dialog to specify which object you want to look for.

"Column Name", first line: Type the name of the object you are searching for in the first line. The name of the column that you specified in the first Find dialog is listed to the left of the box. If MapInfo cannot find the specified object, it prompts you with the message "Exact match not found" and displays a list of objects.

"Column Name", second line: If you have used the Refine option in the first dialog, a second column name is listed in the dialog. This is where you type the name of the refining boundary.

List box: If MapInfo cannot find an exact match for the object you specified, it lists possible matches in this box. Click Up or Down to move to other pages. To choose a specific entry from the list, click on that entry.

Cancel: Cancels the Find.

Respecify: Returns you to the first Find dialog, so you can choose another table and/or column.

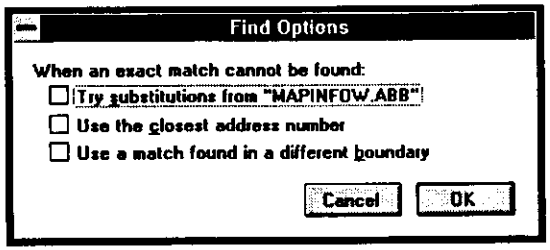
OK: Initiates the Find.

Options

MapInfo has three options you can use with Find.

- Click on Options in the first Find dialog.

The Find Options dialog is displayed:


Find Options
When an exact match cannot be found:
Try substitutions from "MAPINFOW.ABB"
Use the closest address number
Use a match found in a different boundary
Cancel
OK

Specifying Find Options

Try substitutions from "MAPINFOW.ABB": When you choose this option, MapInfo makes substitutions from the abbreviation file. You can make several kinds of additions to this file. These additions deal with various kinds of geocoding problems. See Appendix 3, Advanced Geocoding.

Use the closest address umber: Choose this option to match an address number to the nearest address range. This is useful when there is no range for the address, either because the address falls in a gap or beyond the range end.

Use a match found in a different boundary: When you use Find, you have the option of selecting a boundary to use in refining the process. MapInfo searches for a street name and address name first. Then it finds out what boundary the address is in. When address is in only one boundary, but not the one you selected in the Refine option, MapInfo locates to that boundary.

Locating a street address

When locating a street address, type in "# Name", such as "30 Elm St" or "1045 Templar Blvd".

MapInfo comes with a text file called MAPINFOW.ABB [MapInfo Abbreviations]. which has a list of common street abbreviations, such as "St" for "Street" and "Blvd" for "Boulevard," and so forth. These help MapInfo to get exact matches.

You can also use the Find command to locate street intersections. When you type in the name of the object to be found in the second Find dialog (enter object name to find), separate the two items by a double ampersand (&&). For example, to find the intersection of Congress Street and Christie Street, type in "Congress Street && Christie Street."

Find Selection

Menu Path

Analyze > Find Selection

Option Enabled If...

The Browser is active and at least one row is selected.

The Mapper is active and at least one object is selected.

Purpose

Find Selection allows you to select an item(s) and automatically find and display the selection in all windows.

Using Find selection

- Choose Find Selection from the Analyze menu.

If one or more objects are currently selected, Find Selection updates all windows so that the selected item(s) appear in Browser and Mapper windows.

If one object is selected, all Browsers display the selected record at the top of the Browser, and any Mapper containing the table displays the selected item.

If more than one object is selected, any Mapper may also change its zoom level in order to display all selected items at once.

Font

Menu Path

Style > Font

Option Enabled If ...

Always

Purpose

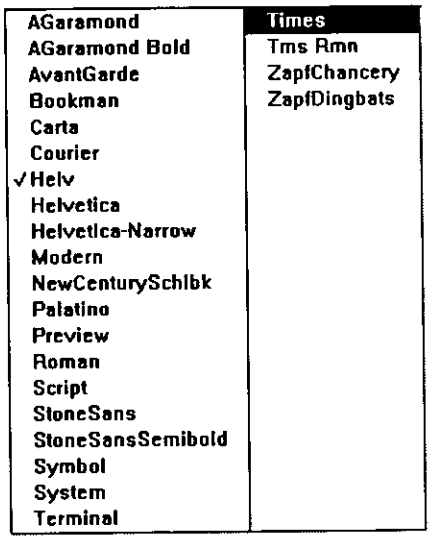
Font allows you to choose a font for labeling or text.

Using Font

To display a list of fonts:

1. Choose Font from the Style menu.

A list of available fonts is displayed:



2. Hold the mouse button down and drag the cursor onto the font you want.
3. Release the mouse button, and the font is selected.

When you want to change the font of already existing text, simply select that text and then choose a new font from the Font menu.

Frame Tool

Menu Path

Tool Palette

Tool Enabled If ...

A Layout is the active window.

Purpose

Allows you to create window frames in a Layout. Each frame can display one Mapper, Grapher, Browser, Map legend or Graph legend.

Using Frame Tool

To use the Frame tool:

1. Choose the Frame tool from the Tool palette.

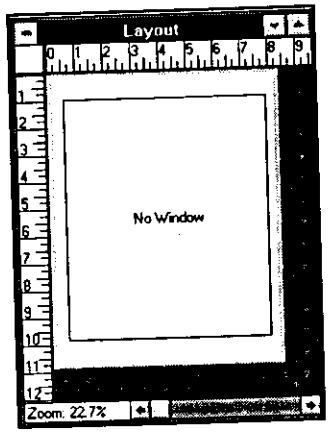
The cursor becomes a small cross. Move the cursor to where you want to begin drawing your frame.

2. Click and hold down the mouse button.

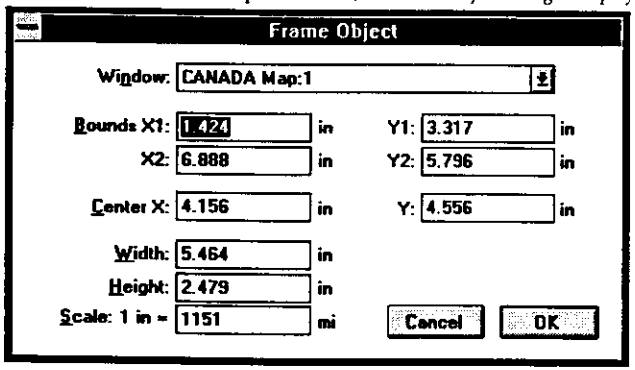
Drag the cursor diagonally until the dashed box outlines the area where you want the frame.

3. Release the mouse button.

When there are no windows open, MapInfo creates an empty frame with "No Window" inside.



When there are one or more open windows, the Frame Object dialog is displayed:



The Frame Object dialog allows you to change the width, height, and center of the frame and to set a specific scale for a map. When there are several windows open on the screen, MapInfo displays its choice in the Window menu. This menu allows you to choose which window you would like in your frame.

To choose MapInfo's choice:

3. Click OK.

That window is placed into the frame.

To choose a different window:

3. Choose the window from the dialog's Window menu.
4. Click OK.

The window is placed in the frame.

Once you have created a frame, you treat it much like any other graphic object. You can change its size and position, its line style and fill pattern, and you can cut, copy, and paste it.

However, while you can change the proportions of a frame, this is not effective when the frame contains a Mapper. (See Changing a Map's Proportions below.)

Changing the Contents of a Frame

When you want to change the contents of a frame once you have placed it in a Layout:

1. Double-click on the frame.

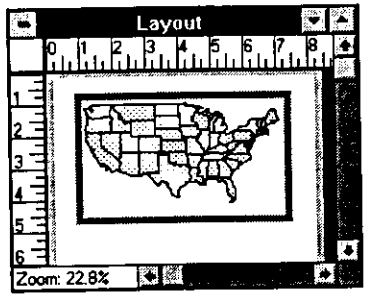
MapInfo displays the Frame Object dialog (above).

2. Choose a new window from the dialog's menu.
3. Click OK.

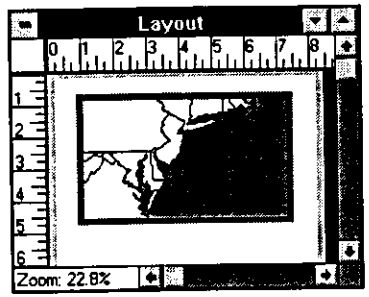
The existing window is replaced with the new one.

Frame Border and Background

You change the line style for a frame's border by using Style > Pick Line when the frame is selected.



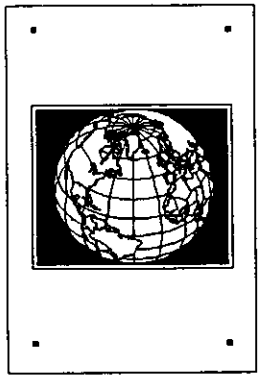
You change a window's background color by using Style > Pick Fill. For example, you can set the background fill and create an ocean background for maps.



Changing a Map's Proportions

When a frame displays the contents of a Mapper, it displays a map having the same proportions and map view as that Mapper. When your Mapper is zoomed in on an area 356 miles by 273 miles, the frame shows just that area. You cannot "crop" the map view by moving the edges of the frame over the map. MapInfo simply resizes the map, preserving its view. The proportions of a Mapper's frame have no bearing on the proportions of the map displayed in it. In the example below, the edit handles (small squares) show the corners of the frame, which is tall and narrow. The map, however, is slightly wider than it is high. MapInfo has positioned that map at the center of this tall and narrow frame.

When you want to change the proportions of a map, resize the original Mapper. MapInfo automatically transmits that change to the Layout frame.



Text from the Mapper appears in the same relative proportions as it has in the Mapper.

You can use a frame's Frame Object dialog to size the map so that it has a specific scale. For example, when you want one inch to equal 50 miles, type 50 into the Scale box and the map is rescaled so that one inch on the Layout page equals 50 miles. When the map no longer fits into your Layout and you do not want to change the scale, then you need to reduce the view in the Mapper and reset the scale in the Layout.

To reduce the view, use the Zoom-in tool or the Change View dialog. MapInfo changes the view in the Mapper and then changes the contents of that Mapper's frame in the Layout.

To reset the map scale:

1. Click on the layout, making it the active window.
2. Double-click on the map frame to bring up the Object Frame dialog .
3. Set the map scale to the desired value.

Map Legend

Frames display map legends at the same size they are in the Map Legend window, using the same fonts and sizes set in the Map Legend window. When you size a legend's frame so that it is smaller than the legend, it crops the legend rather than shrinking it to fit. You can add a map legend to the Layout even when no legend is displayed elsewhere on the screen.

Grapher

Graphers are displayed in a frame so that they completely fill the frame. Graphs are displayed according to the proportions of the frame, not the Grapher.

The frame displays graph text at the point size the text has in the Grapher. When a frame is substantially smaller (as measured by the frame's rulers) than the Grapher it displays, the text may get squeezed.

The symbols used to display a data series in line graphs and X-Y graphs are also displayed at the point size set for them in the Grapher. You should be careful about the frame size of a line or X-Y graph with many points.

Graph Legend

Frames display Graph legends as the same size they are in the Graph Legend window, using the same fonts and sizes. When you size a legend's frame so that it is smaller than the legend, it crops the legend rather than shrinking it to fit.

Browser

A frame displays a Browser with the column headings at the very top of the frame. Immediately below, it displays the contents of the Browser, starting with the row and column at the upper-left corner of the Browser. It displays as many columns and rows as it can fit in the frame, regardless of how many are displayed in the Browser. When you resize the frame, the number of rows and columns displayed are adjusted accordingly. However, fields removed from the Browser with the Pick Fields command are not displayed in a Browser frame.

The number of rows and columns that can be displayed in a frame depends on font size and column width. The frame displays Browser text using the font style and size for that Browser. When you want a different type style in the frame, you have to make the change in the Browser. When you use smaller type, you can get more rows and columns in a frame.

You can also manually adjust column width in a Browser without affecting the underlying field size for the base table. You do this by clicking and dragging the short vertical bars separating the column names in the Browser window.

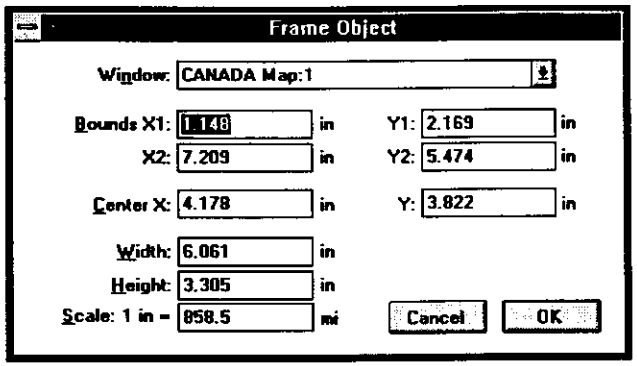
Frame Attributes

The Frame Object dialog allows you to display and change the attributes of a frame and also to change the window being displayed.

To access the Frame Object dialog:

- Use the Select tool and double- click on the object.

The Frame Object dialog is displayed:



Specifying Frame Attributes

Window: Use this menu to choose a different window to display in the current frame.

Bounds: X1 and X2 are the left and right boundaries, respectively. Y1 and Y2 are the top and bottom boundaries respectively. You can type new values for these coordinates. These coordinates represent positions on the layout, where 0,0 is the upper-left corner.

Center X, Y: The coordinate values of the frame's center.

Width: Left-to-right distance of the frame.

Height: Top-to-bottom distance of the frame.

Scale: This line displays the current scale for a frame displaying a Mapper. You can type in a new scale. When you do so, MapInfo resizes the frame so that it displays the map at the specified scale.

Geocode

Menu Path

Table > Geocode

Option Enabled If...

The table you are geocoding against is mappable (graphic objects attached to records) and has an indexsed field, and at least one other table (the table you geocode) is open.

Purpose

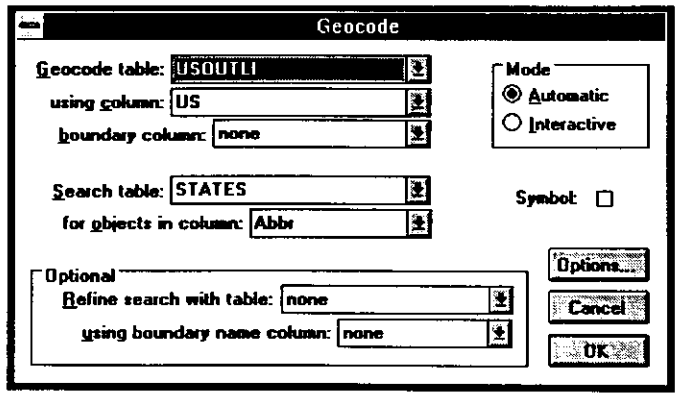
Geocoding allows you to assign point objects to rows in a table. Data in the record (such as street address, ZIP Code, county, state) is used to match against a map (street map, ZIP Code map, state map) to determine where the point for that record should go.

Using Geocode

To geocode a table:

1. Open at least one mappable table. This table serves as the source of geographic information in the geocoding operation (a street map with addresses indexed).
2. Index this source table on the field you use for geocoding. (For more information on indexing, see New on the File menu.)
3. Open the table to be geocoded. (This table must be different from the source table.)
4. Choose Geocode from the Table menu.

The Geocode dialog is displayed:

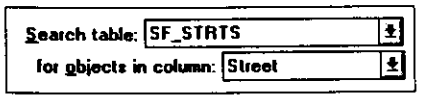


Fill-in the relevant dialog information as follows:

Geocode table: Use this menu to pick the table to be geocoded.

Using column: Use this menu to pick the column containing the location information (addresses, county names, ZIP Codes, etc.) that is the basis for the geocoding.

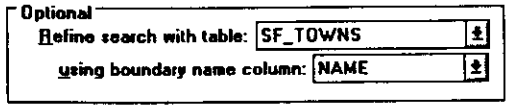
Boundary column: Use this menu to choose a column from the target table that refines the geocoding to the relevant area (e.g., counties within a certain state, streets in a certain municipality, etc.). It is not necessary to include a boundary column when geocoding. Note that, since this option functions in conjunction with the option to Refine Search With Table, you cannot pick it until you have picked a refining table. See the section on Refining Your Search (below).



Search table: Choose the table that is the source of the geographic information, us_zips, sf_strts, and so forth (source table).

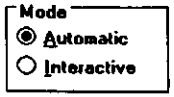
For objects in column: Choose the column containing the name of the objects.

The following option works in conjunction with the column you chose in boundary column:



Refine search with table: Pick your refining table here.

Using boundary name column: Pick your refining column here.



Mode: Choose Automatic when you want to geocode without any intervention. Choose Interactive when you think intervention is necessary to get items appropriately coded. (See below for a description of the Interactive dialog box.) In general, you should first geocode a table in Automatic mode and then go though it again in Interactive mode to finish the job.

Symbol: Clicking on this box activates the Symbol Picker, where you chose the symbol you want and designate its point size and color. Each point that is geocoded displays as this symbol when the layer is displayed with the Default setting in Layer Control.

Options: Click on Options to display the Geocode Options dialog. This dialog contains various options used to refine the geocoding process.

Cancel: Cancels the geocoding and removes the dialog.

OK: Executes the geocoding.

Refining Your Search

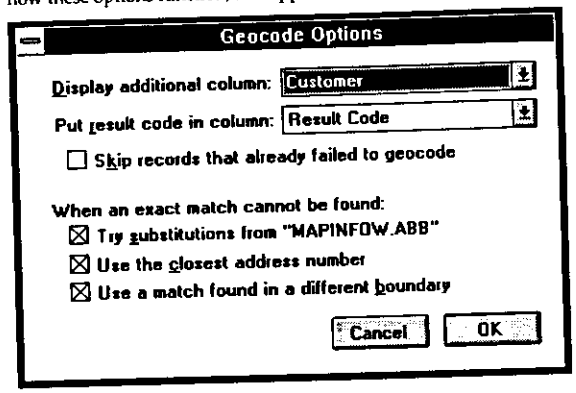
When geocoding, you might refer to objects whose names are used for other objects that do not interest you. (For example, a city name that is common to two or more states.) To eliminate this problem, refine your search by selecting another column (from, typically, another table). To further refine the search, specify the state for each city, rather than just the city name.

In Automatic mode, only exact matches are geocoded. When some of your data fails to match exactly (due, perhaps, to typographic errors), you need to geocode in Interactive mode to match the near misses by hand. It is generally best to do two passes through your table, with the first pass set on Automatic and the second pass set on Interactive. This approach takes less processing time.

Options

The Geocode Options dialog, accessible from the Geocode dialog allows you to control the details of the geocoding process. The default settings are chosen to give you the best results for most situations.

This section only explains how to select options from the dialog. For more information about how these options function, see Appendix 3, Advanced Geocoding.


Geocode Options
Display additional column: Customer
Put result code in column: Result Code
Skip records that already failed to geocode
When an exact match cannot be found:
Try substitutions from "MAPINFOW.ABB"
Use the closest address number
Use a match found in a different boundary
Cancel
OK

Selecting Geocode Options

Display additional column: When geocoding in Interactive mode, it is often useful to view information other than the address being geocoded. You might, for example, want to see the company name while geocoding. You can choose a column to view by choosing one from the Display additional column menu.

Put Result Code in Column: When MapInfo geocodes, it generates a code for each record. Use this code to diagnose failures and to see what options MapInfo used to get matches. You can designate a column where MapInfo should place this code. You can then examine the codes and formulate a strategy for further geocoding. This column should be a numeric field. See Appendix 3, Advanced Geocoding.

Skip records that already failed to geocode: When you are geocoding in interactive mode and have a lot of records, you may not be able to complete the job in a single session. When you come back in later sessions, you do not want to retry records that have failed. Check this box so that MapInfo skips those records. This option is available only when you use a result code column. MapInfo automatically skips records that have already been geocoded.

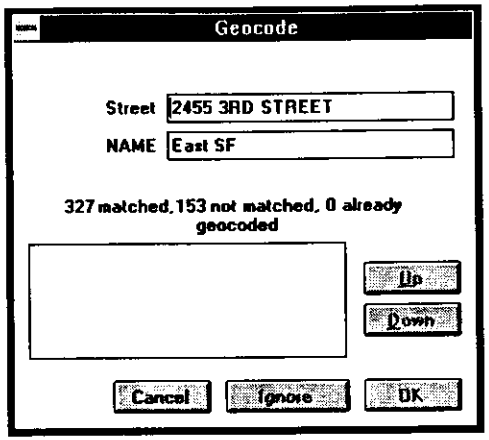
Try substitutions from "MAPINFO.ABB": When this option is selected (checked), MapInfo makes substitutions from the abbreviation file. You can make several kinds of additions to this file to deal with various kinds of geocoding problems. See Appendix 3, Advanced Geocoding.

Use the Closest address number: When you choose this option, MapInfo matches an address number to the nearest address range in those cases where there is no range for the address, either because the address falls in a gap or beyond the range ends.

Use a match found in a different boundary: When you geocode, you have the option of selecting a boundary to use in refining the geocoding. MapInfo searches for a street name and address name first. Then it finds out what boundary the address is in. When it is in only one but not the one, you chose in the Refine option, MapInfo geocodes to that boundary. When it is in more than one boundary, but none of them are the ones you selected, MapInfo will not geocode the record.

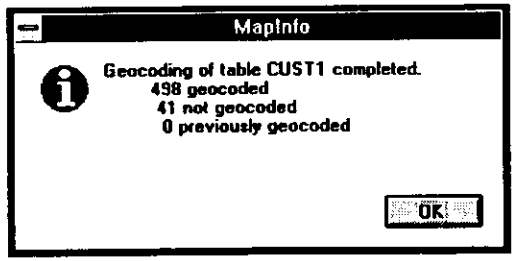
Automatic Geocoding

Automatic geocoding displays addresses while geocoding:



You can click cancel to interrupt processing. When processing is interrupted, you can display the points that are geocoded.

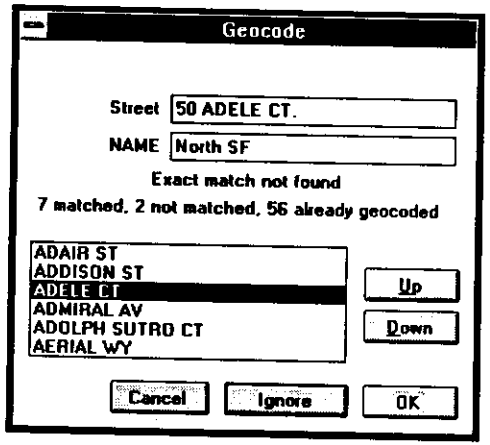
When MapInfo is finished geocoding, the results are displayed:



When there are ungeocoded records, you need to do something about them. One thing you can do is to geocode the remaining records interactively. For other possibilities, see Appendix 3, Advanced Geocoding.

Interactive Geocoding

When you choose Interactive geocoding, MapInfo displays a dialog that allows you to manually match each address it was unable to match.



To geocode interactively:

- Click on a value in the list box (for example,"ADELE CT"), and click OK to match the target table's field value ("ADELE CT."—note the period).
- Retype the target table's field value in the text box at the top of the dialog (type "CT" over "CT.") and click OK to retry the match.
- Click Ignore to skip trying to geocode this record.
- Click Cancel to stop geocoding at this point.

Use the Up and Down buttons to move around in the list of source addresses.

Finding Ungeocoded Records

Once you have completed a geocoding session, you might want to find all the ungeocoded records and examine them to see what the problems are. You use Select to do this.

When you do not have a column for result codes, you should select all records that meet this condition:

```
not obj
```

"Obj" (or "object") is a keyword MapInfo uses to refer to a graphic object. Records that have been geocoded have an object, and therefore fail to meet this condition. Records that have not been geocoded meet the condition.

When you have specified a result code, select all records meeting this condition:

```
result_code < 0
```

For more information on result codes, see Appendix 3, Advanced Geocoding.

See Also

If you are unfamiliar with the concept of geocoding, consult the MapInfo User's Guide for more information.

If your table already has coordinates which you would like to use to create point objects, use Create Points.

Get Info

Menu Path

Edit > Get Info

Option Enabled If...

A Mapper or Layout is active and at least one object is selected.

When a Browser or Grapher is active, the option is never enabled.

Purpose

Get Info allows you to bring up object attribute dialogs for objects in Mappers and Layouts instead of double-clicking on the objects.

Using Get Info

Simply select the object and then pick the Get Info menu option. If the object is editable, you can change its attributes. If it is not editable, you can only be able to view the attributes.

Grabber Tool

Menu Path

Tool palette.

Tool Enabled If...

Mapper or Layout is active.

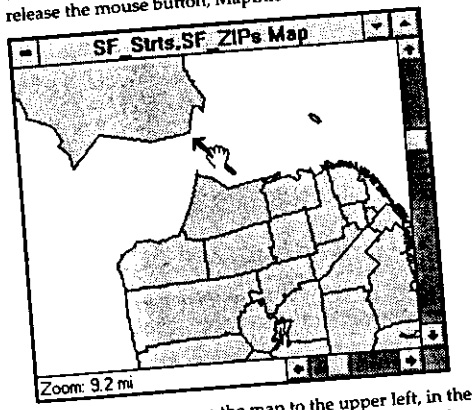
Purpose

The Grabber tool allows you to reposition a map or layout within its window.

Using the Grabber Tool

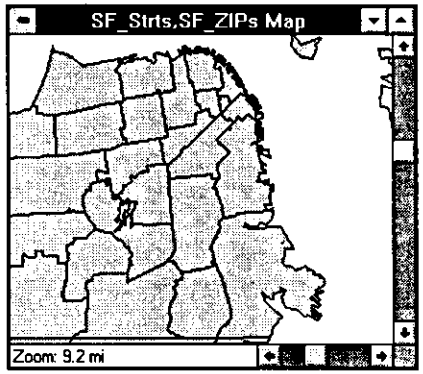
1. Choose the Grabber tool from the Tool palette (hand icon).
2. Click on an area of the map or layout.

While holding down the mouse button, drag the map in the desired direction. When you release the mouse button, MapInfo redraws the map to its new location.



We are going to move the map to the upper left, in the direction of the arrow. (The arrow was added for the illustration; MapInfo does not place an arrow on the screen.)

As you can see, the map is now repositioned in the upper-left portion of the window.



Graph

Menu Path

Window > Graph

Option Enabled If...

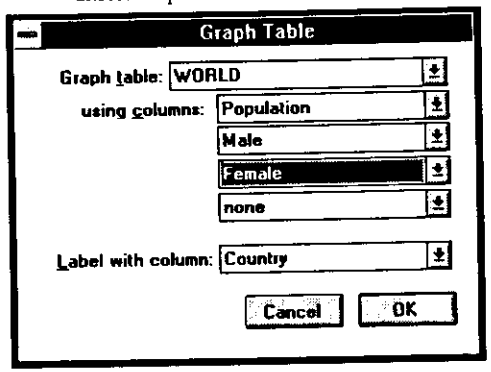
At least one table with at least one numeric column (integer, small integer, decimal, float) is open.

Purpose

Allows you to display a table as a graph.

Using Graph

- Choose Graph from the Window menu, and the Graph Table dialog is displayed:



The Graph Table dialog allows you to choose a table to graph and up to four columns from that table.

1. Choose the table from the Graph table menu.
2. Choose up to four columns from the four using columns menus.
3. Choose the field that the records are to be labeled with: Label with column menu.
4. Click OK.

MapInfo brings up a Grapher where your data is graphed in the default type of graph, a rotated bar graph.

When you intend to make an X-Y graph, choose the column to be graphed along the X-axis from the first menu. Columns chosen in successive menus are graphed along the Y-axis.

Graph Type

Menu Path

Graph > Graph Type

Option Enabled If ...

A Grapher is the active window.

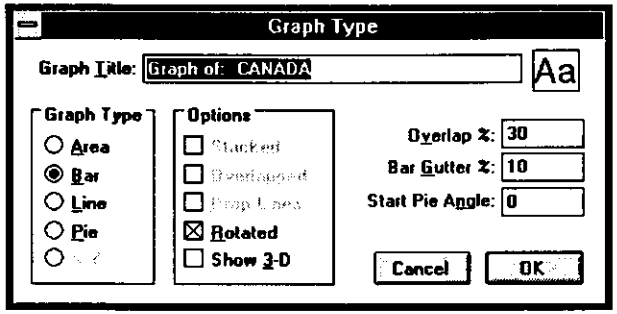
Purpose

Use the Graph Type dialog to pick the type of graph and graphing options.

Using Graph Type

- Choose Graph Type from the Graph menu.

The Graph Type dialog is displayed:



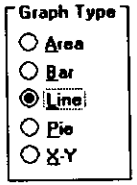
Use the top line of the dialog to set the graph title:

Graph Title: Type in the title. You can leave MapInfo's default title: "Graph of SOME_TABLE".

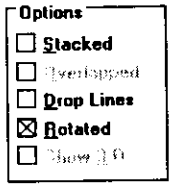
Choose a text style for the title by clicking on the text icon (Aa) and choosing a font and size from the Font Picker.

You can also delete the text so that there is no title in the Grapher. This allows you to place a more elaborate title in a Layout.

Use the left column to pick a type of graph. For an explanation of graph types, refer to page 110.



Use the middle column to choose various options. Different options are available depending on the type of graph. For example, the Stacked option is available for line, area, and bar graphs, but not for pie or X-Y graphs. When an option is not available for the chosen graph type, that option is grayed out.



The options are:

Stacked: Places graph areas, lines, or bars on top of each other rather than side by side.

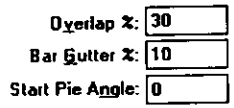
Overlapped: Sets the bars graphing different quantities on a bar chart to overlap.

Drop Lines: Extend from the top of the highest series in an area, line, or X-Y graph to the horizontal axis.

Rotated: Rotates the graph 90 degrees so that, for example, the bars in a bar chart run horizontally rather than vertically.

Show 3-D: Causes the graphic objects in area or bar charts to be represented as three-dimensional.

The right column displays the following three options:



Overlap %: When you are using a bar graph with information from more than one table column, you can control how far each bar overlaps the others in a group by entering a number in the Overlap % box. Enter 0 and the bars will not overlap. Enter 100 and the bars overlap completely when overlap is turned on.

Bar Gutter %: When you are using a bar graph, you can control the space between the bars, which in turn affects the thickness of the bars, by setting the Bar Gutter %. When you enter 0 in the box, there is no space and the bars appear right next to each other. When you enter 90 the bars are thin and have large spaces between them. You can type any number between 0 and 99.

Start Pie Angle: When you are creating a pie graph, you can set the starting pie angle. A pie graph starts with the first item in the corresponding Browser. You can adjust the orientation of the starting pie angle in degrees clockwise. Zero degrees (the default) starts the first wedge at a 12 o'clock position going towards a 1 o'clock position. Using 90 degrees starts the first wedge at a 3 o'clock position going towards 4 o'clock. You can set the pie angle from 0 to 360 degrees.

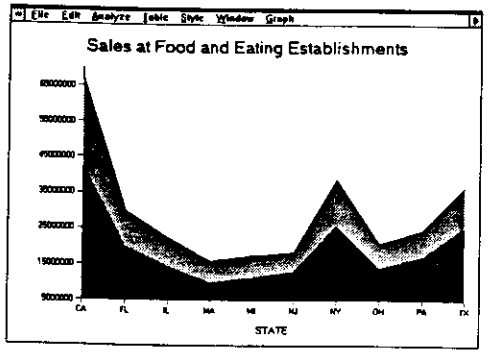
Cancel: Cancels the current dialog. Your graph remains as it was.

OK: Clicking OK causes MapInfo to execute your commands.

Graph Types

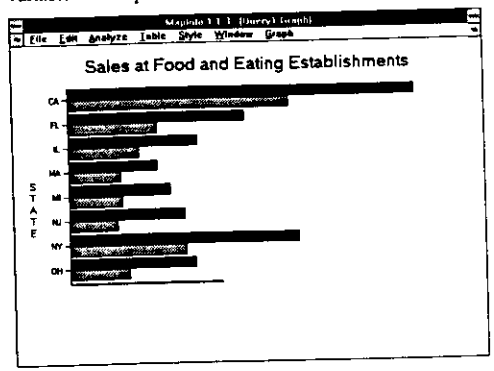
Area Graph

Area graphs represent quantities as the size of an area on the graph. This type of graph is similar to a line graph, with the area between the line and the label axis filled. When you choose the Stacked option, MapInfo stacks one data series above the other, so that the shaded areas are proportional to data values. This is the usual way in which area graphs are done.



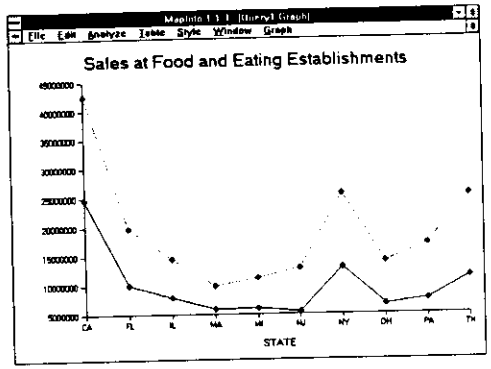
Bar Graph

Use Bar graphs to compare a relatively small number of discrete items. Quantities are represented by the length of the bar. MapInfo allows you to graph up to four variables in a single bar graph. MapInfo positions the columns for the variables side-by-side unless you choose the Stacked option. When you choose the Stacked option, MapInfo stacks the bars for each variable one atop the other.



Line Graph

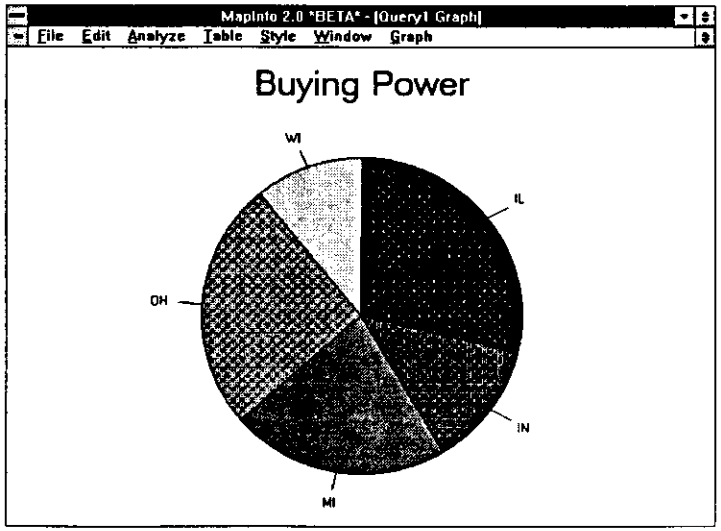
Line graphs plot data points at equal intervals along the label axis, connecting the points with a line. MapInfo allows you to plot up to four different variables at a time. MapInfo automatically uses a different colored point for each variable. When you want to set these colors, use the Series option on the Graph menu.



Pie Graph

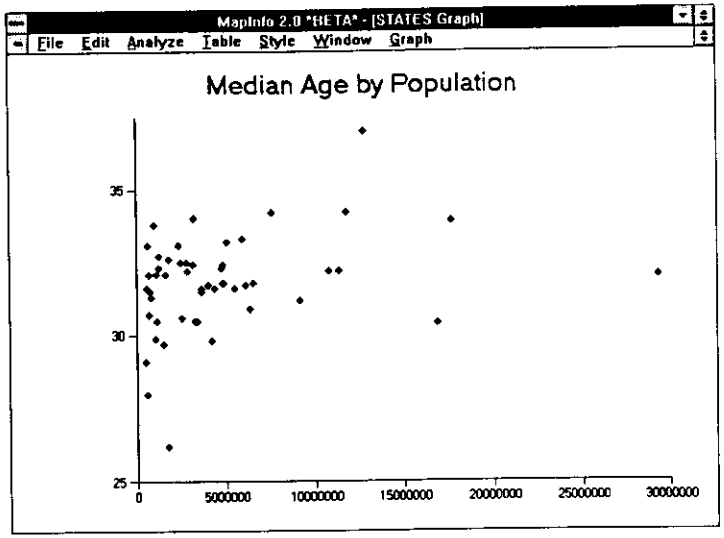
Pie graphs, also referred to as pie charts, show the relative proportions of items, with quantities represented by the area of the pie wedge. In general, you should only use a pie graph if your data values add up to the total of some quantity. For example, if you are graphing the sales in different territories, you should use a pie graph only if you are graphing sales for all your territories. That way the size of a territory's wedge accurately represents its contribution to the total sales effort. When you are only graphing the sales of five (out of 13) territories, then you should use a bar chart. The bar chart allows you to compare the sales of those five territories, but doesn't imply that they represent the entire sales effort, as a pie chart would.

It is difficult to show small differences between two percentages with a pie graph. You should try to limit the number of wedges in a pie because it often becomes difficult to see the differences between values in an over-crowded pie.



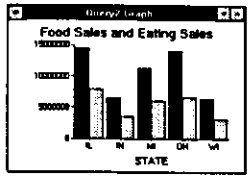
X-Y Graph

X-Y graphs are also known as scatter plots. These graphs plot points according to their X and Y coordinates without any connecting line. When you want to examine the correlation between variables, use an X-Y graph. When you specify the columns to be graphed (in Window > Graph), the first column is graphed along the X (label) axis, while the other column is graphed along the Y (value) axis.

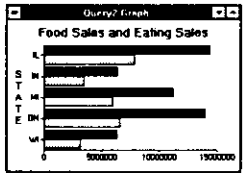


Customizing Graphs

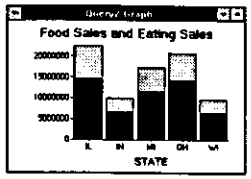
You can create a variety of different graphs by using the various customizing options. The following illustrations show some of the possibilities. You can add grid lines by using the Label Axis and Value Axis dialogs.



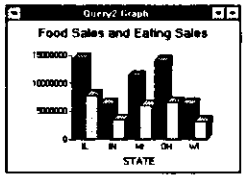
Basic Bar Chart



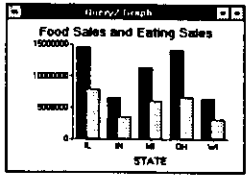
Rotated Bar Chart (MapInfo's default type)



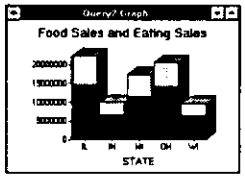
Stacked Bar Chart



3-D Bar Chart

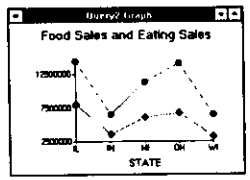


Overlapped Bar Chart

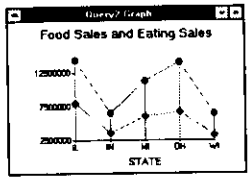


3-D Stacked Bar Chart

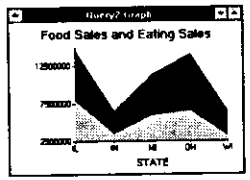
Customizing Graphs (continued)



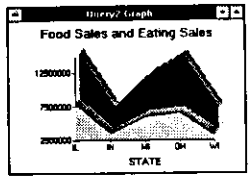
Basic Line Graph



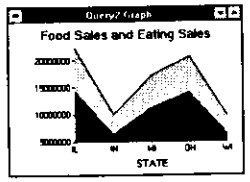
Line Graph with Drop Lines



Area Graph



3-D Area Graph



Stacked Area Graph

Help

Menu Path

File > Help

Option Enabled If ...

Always.

Purpose

Help allows you to display on-line information about MapInfo's commands and tools.

Using Help

- Choose Help from the File menu.

The Help dialog is displayed and a Help menu is added to the menu bar at the far right.

You can choose a Help topic by clicking on it. When you are reading about a topic, the availability of other information is indicated to you in two ways: the text itself is bold, and the appearance of the cursor changes as you move the mouse over the text. When the cursor is the customary pointer, then there is no further help information about that text. When the cursor changes to a pointing hand as you hover over that text, it is a help topic and further information is displayed about it when you click on it.

Two options appear at the bottom of the Help window that assist you in navigating through Help:

Topics: Click on this to return to the list of Help topics.

Previous: Click on this to return to the Help topic you were previously viewing.

Import

Menu Path

Table > Import

Option Enabled If ...

Always.

Purpose

Import allows you to import vector (but not raster) graphics files.

Using Import

You can import files in the following formats:

- MapInfo Interchange: MapInfo Interchange Format (MIF)—MapInfo's data interchange format.
- DXF: The graphic/data interchange format for AutoCAD and other CAD packages.
- MBI: MapInfo Boundary Interchange format: An ASCII file for MapInfo DOS boundary files.
- MMI: MapInfo Map Interchange format: An interchange format for MapInfo DOS street maps.
- IMG: A file format for MapInfo for DOS image files.

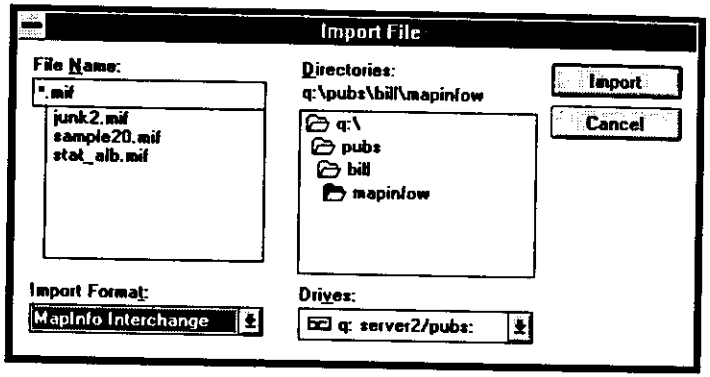
MapInfo imports graphics and textual information from MapInfo Interchange Format, DXF, MBI, and MMI files. MapInfo imports only graphics from IMG.

MapInfo for DOS can produce ASCII files in MBI and MMI format. MBI format is used for importing and exporting boundaries (regions), while MMI format is used for importing street maps (lines). Image files are binary files containing various types of graphic objects. MapInfo can import these files directly. These formats are documented in detail in the MapInfo for DOS User's Guide.

The following is the general procedure for importing a file:

1. Pick Import from the Table menu.

The Import File dialog is displayed:



2. Choose the proper format from the dialog's Import Format menu.
3. Choose the file you want to import.
4. Click on Import.

You are prompted to choose the name and table format of the table to create.

5. Choose a name and a format.
6. Click Save.

MIF Import

MapInfo Interchange Format (MIF) is an ASCII file format that can fully describe a MapInfo database. Both graphic and tabular data are stored in MIF files. MIF files are created by MAP2MIF, BDY2MIF, MapInfo, and other programs. You can create your own MIF files in any ASCII text editor to later import into MapInfo. The MIF format is fully described in Appendix 1.

MapInfo for DOS Files

When you want to import files from MapInfo for DOS to MapInfo, we recommend you use the utilities we have created to facilitate this operation: **MAP2MIF** and **BDY2MIF**, which are documented in Appendix 2. These utilities work from within MapInfo for DOS and allow you to convert MapInfo for DOS files into MIF files. You can then import those files into MapInfo using the MapInfo Interchange option in the Import File dialog.

Why should you use MAP2MIF, followed by MapInfo Interchange format, rather than MMI import?

- MAP2MIF creates a view, just like a StreetInfo. A StreetInfo table contains one table with street names and another table with address ranges for each individual street segment. This occupies less disk space than the file created by MMI import because the name is not duplicated for every segment.
- MAP2MIF has better support for line styles and colors.
- MAP2MIF allows you to specify an abbreviation file to use.

Why should you use BDY2MIF, followed by MapInfo Interchange format, rather than MBI import?

- BDY2MIF allows you to specify whether or not to close boundaries. When you use line-shaped boundaries in your DOS boundary file, you do not want those boundaries turned into polygons when they are imported. MBI import automatically closes those boundaries. BDY3MIF gives you the option of leaving those boundaries open.
- BDY2MIF has better support for line styles, fill patterns, and colors.

AutoCAD DXF Import

MapInfo lets you import and export files with DXF (drawing interchange file) format. DXF is a format used by AutoCAD and other CAD packages. MapInfo can import both graphical and tabular information from DXF files.

There are many variations of the DXF format. MapInfo has tested compatibility with files that follow the DXF format specified with AutoCAD Release 10 or higher. However, DXF files created with other packages should also work.

Technical Notes About the DXF File Format

A DXF file is a specially formatted text file that can be modified with any ASCII editor. Every item in a DXF file consists of 2 lines. The first line is a number, which describes the type of data specified on the next line. DXF files are organized into four sections. Not all of these sections are present in all DXF files. These sections are described below:

- Header: Contains general information about the contents of the file, including the extents of the drawing. The extents tell MapInfo the size of the drawing. The extents are expressed as a set of two points which form two corners of a rectangle that surrounds the drawing. MapInfo uses this information to automatically compute a coordinate transformation. When the header section is not present in the DXF file, you probably need to manually specify a coordinate transformation.
- Tables: Contain block definitions. A block is a composite object formed by combining simple objects such as lines, circles, polylines, etc. Blocks contain attribute definitions; text strings of data stored with the objects. When the blocks section is not present in the DXF file, MapInfo cannot import attribute data (tabular data). In addition, MapInfo is forced to ignore all copies of the blocks in the drawing.
- Entities: Contain the actual graphic objects that make up the drawing. Every DXF file must contain an entities section.

For additional information about the DXF file format, consult the appropriate section of the AutoCAD documentation.

Using DXF Import

DXF import works with a wide range of projections and coordinate systems. This simplifies the process of importing DXF maps, which use coordinate systems other than longitude/latitude. In most cases it eliminates the need to set a transformation. Two situations do require a transformation to be set:

- When you are importing a map created in a coordinate system not supported by MapInfo.
- When you are importing a map whose coordinates are geographically meaningless. For example, If you are importing a map image from a drawing package, the image's coordinates have no relation to the earth's coordinates.

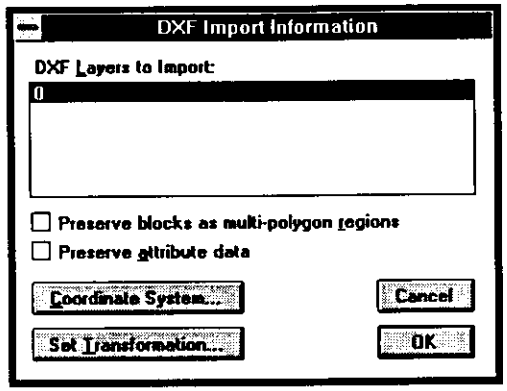
To use DXF Import:

1. Choose Table > Import.
2. Choose AutoCAD DXF from the Import File dialog's Import Format menu.
3. Click Import.

The Import Into Table dialog displays.

1. Type a name for the table.
2. Click Save.

The DXF Import Information dialog displays.



Use this dialog and the ones that follow it, to accomplish your import.

Specifying DXF Import attributes

DXF Layers to import: Use this list-box to choose which layers in the DXF drawing you want to import into MapInfo. This is important since different layers in DXF drawings usually contain conceptually different types of information. One layer might contain notes and labels, another might contain buildings, a third might contain streets, etc. In many cases, it makes more sense to load these layers into different MapInfo tables, especially when tabular data is involved. By doing so, you can turn on or off different MapInfo layers in your maps. When you do not specify which layers to import, all layers in the DXF drawing are selected.

Preserve blocks as multi-polygon regions: Blocks can contain multiple objects, including multiple polygons. A block for New York State might contain 2 polygons: one for the mainland, and one for Long Island. When this box is checked, blocks of this type produce a single MapInfo object out of all the polygons in the block. When the box is not checked, multiple objects are produced.

Preserve attribute data: When this box is checked, tabular information from DXF attributes are read into the table. Preserving attribute data requires that the DXF Import program make two passes through the entities section of the DXF file. It takes significantly longer to import this information.

Coordinate System: Click this button to set the coordinate system you want to import to. This procedure is described below.

Set Transformation: Choose this box to enter a coordinate transformation. MapInfo displays the Set Coordinate Transformation dialog.

Two situations require a transformation to be set:

1. When you are importing a map created in a coordinate system not supported by MapInfo.
2. When you are importing a map whose coordinates are geographically meaningless, e.g., a map image from a drawing package.

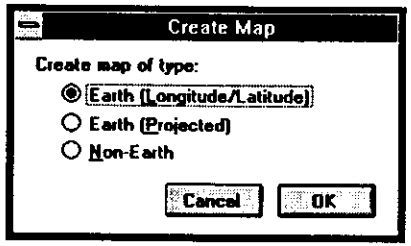
This procedure is described below.

Choosing a Coordinate System

When you do not choose a coordinate system, MapInfo defaults to a non-Earth map (Cartesian coordinates) with units in feet. The bounds of the map are the extents of the DXF drawing.

- Click on Coordinate System (in DXF Import Information).

The Create Map dialog is displayed:



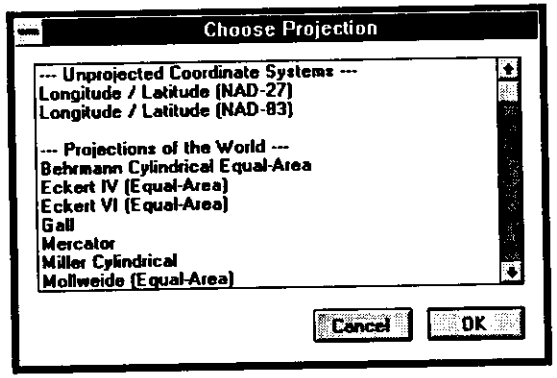
When you are importing a map stored in longitude/latitude coordinates:

1. Choose the Earth (Longitude/Latitude) option.
2. Click OK, and MapInfo begins the import.

When you want to import a map stored in some other coordinate system, such as any of the State Plane coordinates, or the UTM's:

1. Choose the Earth (Projected) option.

The Choose Projection dialog is displayed:

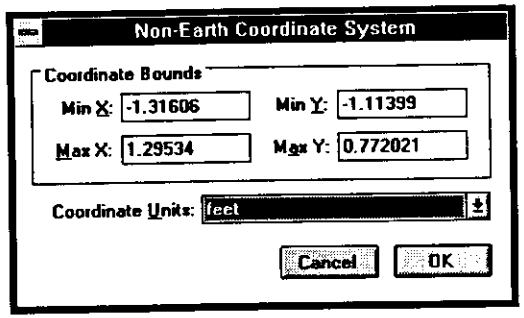


2. Choose the projection you want.
3. Click OK .

When you are working with a non-earth map, such as a floor plan:

1. Choose the Non-Earth option.

The Non-Earth coordinate system dialog is displayed:



2. Fill in the dialog with the appropriate information. You can set coordinate units in this dialog.
3. Click OK.

MapInfo imports your DXF file.

Coordinate Transformations

Because CAD packages represent drawings in Cartesian coordinates, all drawings imported or exported between MapInfo and CAD suffer some distortion. This comes from trying to display Cartesian information on a spherical coordinate system (like the globe). Coordinate conversions are used to assign longitude/latitude coordinates to CAD drawings that were

created using Cartesian coordinates. Conversions near the equator are more exact than conversions at the extremes of the hemispheres. To minimize distortion, import and export with no coordinate conversions and avoid translating maps that cover large areas.

How Does MapInfo Treat Coordinates?

MapInfo treats coordinates as specifying longitude and latitude on a sphere. In the Western hemisphere, this means that X coordinates (longitude) increase to the left, rather than to the right, as in standard Cartesian coordinates. This means that a point on the left side of your map has a greater longitude than a point on the right side of your map.

In the Eastern hemisphere this is not the case, and X increases to the right as you would normally expect.

Latitude (the Y coordinate) increases in a downward direction for maps of areas south of the equator. For areas north of the equator, latitude increases as you move up. This corresponds to the way it works in Cartesian coordinates.

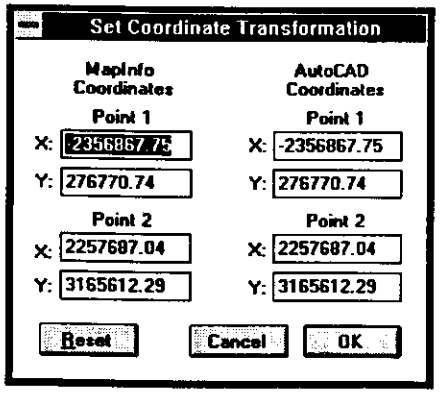
How Do DXF Files Treat Coordinates?

Most DXF maps don't use a longitude-latitude coordinate system. They usually use state plane coordinates or some other coordinate system. When the maps show floor plans, they probably use a Cartesian system (simple X and Y). Typically, coordinates in these systems increase to the right and up.

Coordinate Transformations in DXF Import

- Choose Set Transformation in the DXF Information dialog.

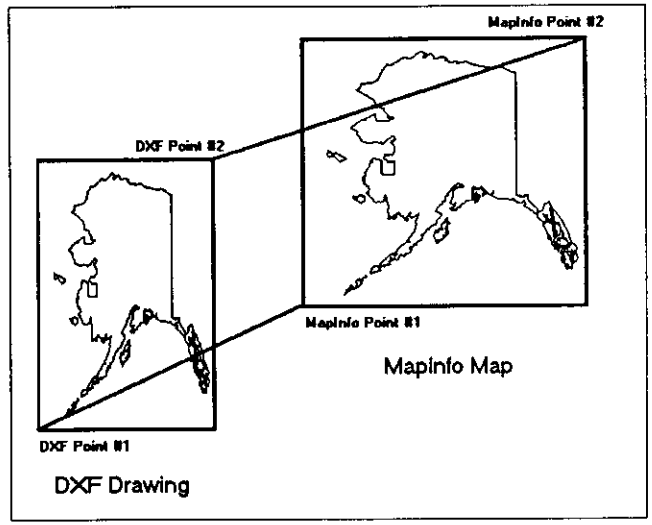
The Set Coordinate Transformation dialog is displayed:



This dialog displays a pair of points, AutoCAD coordinates on the right and MapInfo coordinates on the left. The basic idea behind setting a transformation is that, given the two DXF points, you must pick the two corresponding MapInfo longitude-latitude points. When you use the extents of the DXF drawing (the default), you must enter the extents of the drawing in longitude-latitude coordinates for the MapInfo points.

When your DXF file contains a header section, the two DXF points are the lower-left and upper-right corners of the drawing (the extents). The default MapInfo points are the same as the DXF points. This default transformation translates the map coordinates into X-Y directly. For example, a point at 72.5 degrees west, 42.7 degrees north is translated into (72.5, 42.7).

It should be stressed that you don't have to use the extents if you don't want to. All you need are any two points of the drawing (preferably far apart for greater accuracy) in both coordinate systems: your DXF coordinate system, and longitude-latitude.

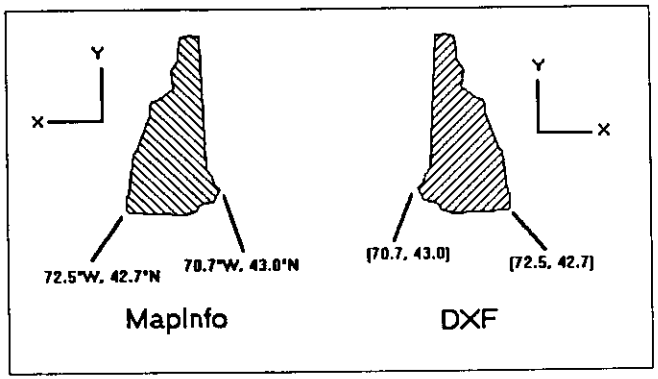


The diagram above shows how coordinate transformations work. Two AutoCAD drawing points and two MapInfo map points define the transformation. Any two points can be chosen, but the lower-left and upper-right extents of the drawing are often used. However, you must know the coordinates of each point in both coordinate systems.

Why Is My Map Backwards?

When discussing coordinate systems above, we noted that X increases to the left in a longitude/latitude map from the Western hemisphere. Most non-longitude/latitude coordinate systems have X increasing to the right. This creates the "backwards map" problem with both import and export.

When you export a map into DXF using the default transformation, the points are transferred directly. As shown above, 72.5° west, 42.7° north becomes (72.5, 42.7). This presents a problem, as shown in the diagram below:



There are two ways you can get around this problem:

When you are using AutoCAD Release 11 or another advanced 3D CAD package with your DXF file, redefine the coordinate system so that X increases to the left and Y increases up. On most systems, this makes Z increase down into the screen, but with two-dimensional maps this never is a problem.

- When entering your AutoCAD points, multiply the X coordinates by -1. Your DXF data will not contain the correct data since 72.5°W, 42.7°N becomes (-72.5, 42.7). But it does look correct.

All of this applies only when you are using the default transformation, or when you want your DXF drawing to use a longitude-latitude coordinate transformation. When you define your own transformation, there will not be a problem. But remember that when your drawing is in the Western hemisphere, the X coordinate of point1 should be greater than the X coordinate of point2.

Importing DXF Attributes into MapInfo

Some DXF files contain textual information associated with graphic objects. In DXF, this is done by creating a block that contains the graphic objects and the textual information (stored in "attributes"). This block is then inserted into the drawing in one or more places, with possibly different data values in each case. There is no database structure imposed on attributes. For example, you might have two types of objects in your DXF file with the following attributes:

Pipes: WIDTH
TYPE (sewer, water, storm sewer, etc.)
MATERIAL

Streets: NAME
ADDRESS_RANGE

When MapInfo creates a tabular database from a DXF file, it must decide on a database structure. **All the records in a Browser contain the same fields.** MapInfo builds a database

structure by scanning the entire DXF file for all attributes in the layers that are being imported, and creating a union of these fields. The data type of each field is determined by the contents of the attributes. For example, when all attributes with a given name contain a number, the resulting MapInfo field is a numeric data type.

Continuing the examples above, when pipes and streets were both imported into the same DXF file, the database structure would be as follows:

ADDRESS_RANGE
MATERIAL
NAME
TYPE
WIDTH

Most well-designed DXF files put objects of different types in different layers. The above DXF file would probably contain 2 layers: pipes (which would hold all the pipes of the map) and streets (which would hold all the streets of the map). Run DXF Import twice, importing a different layer each time. You would create two MapInfo tables, one with the correct pipe structure, and one with the correct street structure.

When you did load both layers of our sample DXF file into one MapInfo table, the records for the pipes would have blank or zero values for the NAME and ADDRESS_RANGE fields. Likewise, WIDTH, TYPE, and MATERIAL would be blank for the street records.

Note: It takes much longer to import attributes from a DXF file into MapInfo than it does to import files with no attributes. The entities section of the DXF file must be read twice. We recommend that you run the import several times, checking to make sure that you are loading the correct layers and using the correct coordinate transformation, before importing the data attributes.

Importing Attributes with Nested Blocks

In the DXF file format, blocks can be nested. The following is the logical structure of our example nested block:

```
Block A
  Line
  Attribute STREETNAME = "Broadway"
  Block B
    Point
    Attribute ADDRESS = "200"
  Block C
    Polygon
    Attribute BUILDING_NAME = "Hendrick Hudson Building"
```

This block consists of a line, an attribute, and two blocks. One of these blocks is a point with the address of a building, the other is a polygon with the name of the building. If all of these blocks were on the same layer (and they don't have to be), the database structure would be as follows:

ADDRESS
BUILDING_NAME
STREETNAME

Objects get the value of all attributes in their current block, and inherit attributes from their parent blocks. In this case, our database would be created as follows:

Object	ADDRESS	BUILDING_NAME	STREETNAME
line	0	<blank>	"Broadway"
point	200	<blank>	"Broadway"
polygon	0	"Hendrick Building"	"Broadway"

As you can see, it is better to put objects of different types in different layers. The problem is figuring out which layer names correspond to which type of objects.

Info Tool

Menu Path

Tool palette.

Tool Enabled If...

A Browser or Mapper is active.

Purpose

The Info tool allows you to view tabular data for a single record.

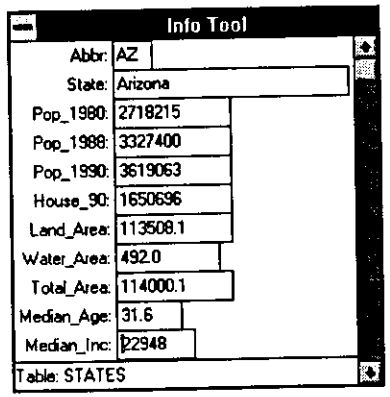
Using the Info Tool

To access the Info tool from a Browser or Mapper:

- Click on a record with the Info tool.

To access the Info tool from a Browser:

- Double-click with the Select tool to get the Info tool window.



The Info tool (lower case "i") enables you to choose an object and see a window displaying information from the table about that object. Click on another object with the Info tool and its information appears in the same window. Click on the Control-menu box [Close box] of the Info window to make it disappear.

When you hold the <CONTROL> [Option] key down while selecting, you can cycle through overlapping objects. When you have overlapping objects in the same layer, MapInfo cycles through them. When you have several selectable layers, and objects in them are overlapping, MapInfo cycles through the layers. This is useful for getting information about objects that overlap or are very close together.

In order for the Info tool to work, the objects you are interested in must be in a selectable layer. When you are using the Info tool and you do not get any information in the Info window (and it tells you "no record selected"), check to see that the appropriate layer is selectable. Similarly, when you are getting information but not about the objects you are interested in, check to see what layers are selectable.

For example, you may be looking for information about hotels and getting information about streets. That is probably because the streets layer is selectable, while the hotel layer is not. You have to use Layer Control to alter the selectability status of various layers in your map.

You can change information in a table through the Info tool. Position the cursor in the appropriate Info tool field and use basic text-editing techniques to change the information.

You can also change the font and style (of the text in the Info tool) by first making it active (click in or on the window), then changing the font and style by bringing up the Font Picker dialog.

Remarks

When you are using MapInfo for Windows, you MUST use the F8 accelerator key to bring up the Font Picker dialog to change the font/style (in the Info tool.) You cannot change the font /style through the menu options via the Style menu. When you are using MapInfo for Macintosh, you can use the options in the Style menu to change the font/style (in the Info tool.)

Join

Menu Path

Analyze > Shade by Value > Join

Table > Join > Join Tables

Option Enabled If ...

Two tables are chosen from the menus in the Shade by Value dialog.

At least two tables are open.

Purpose

Join allows you to tell MapInfo what to do when it cannot make an autojoin, it also allows you to override MapInfo's choice of fields for making the join.

Geographic and Descriptive Join

Shade by Value and Join Tables allow you to join two tables. To do this, MapInfo must know how to associate records in the two tables.

For example, assume you are shading STATES by the values in SALES. Obviously, you want all Pennsylvania sales to be associated with Pennsylvania, all Maryland sales to be associated with Maryland, etc. MapInfo has two ways of doing this:

- From a common descriptive field
- Geographically/graphically

In this case, the most likely descriptive field contains the state name or an abbreviation for the state name. Thus the STATES table might have a field called Abbr, containing the abbreviation of the state name, and SALES might have a field called State, which contains the state abbreviation. MapInfo matches the entries in these two fields so that information in the SALES State field is matched to the record having the same entry in the Abbr field of STATE, thus matching NY (sales) to NY (state), PA (sales) to PA (state), etc.

However, if both tables contain graphic information, MapInfo can also make a graphic match. For example, perhaps you are a conservation official and you want to shade a map of COUNTIES according to the number of FIRES that occurred in the last year. Your FIRES database has been geocoded. In this case MapInfo could examine the coordinates of each fire location and determine the county where the fire had occurred. That would allow MapInfo to associate each fire record with the appropriate county.

How MapInfo Makes an Autojoin

Whenever you use Shade by Value with a source table that is different from the target table, MapInfo tries to determine how to join them. MapInfo first tries to join on the basis of tabular data. When that fails, MapInfo attempts a geographic join. When that fails, MapInfo indicates that "autojoin failed."

In more detail, this is MapInfo's strategy:

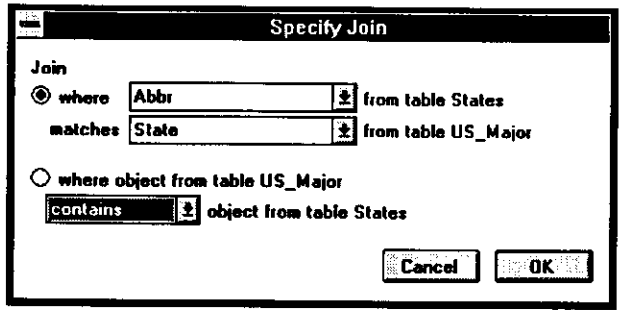
1. MapInfo compares the information in the tabular data in the two tables. When it finds matching data values, MapInfo assumes that it has found matching fields and uses those as the basis of the join. When MapInfo fails to produce a match this way, then:
2. MapInfo attempts to make a graphic/geographic match. MapInfo attempts either to locate source objects within target objects, or to locate target objects within source objects. When MapInfo fails to produce a match this way, then:
3. MapInfo reports that "autojoin failed." In this case you should Click the *Join* button and use the Join dialog to tell MapInfo how to make the join.

Using Join

To access the Specify Join dialog:

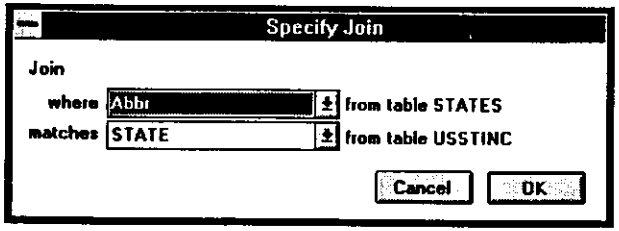
- Choose Join from the Shade by Value dialog.

There are two versions of the Join dialog. When both tables can be mapped, the following Specify Join dialog is displayed:



This dialog allows you to choose whether to make the join on a geographic basis or on a non-geographical attributes basis.

When only one table can be mapped, the following Specify Join dialog is displayed:



This dialog only allows you to specify the join in terms of non-geographical attributes.

To specify a join based on descriptive criteria:

1. Click on the circle next to where menu in the first Specify Join dialog.

However, when MapInfo displays the dialog for mapless tables, go directly to step 2.

2. Use the where menu in the second Specify Join dialog to choose the match field in the source table.
3. Use the matches menu in the second dialog to choose the match field in the target table.
4. Click OK.

To specify a join based on geographic criteria:

1. Click on where object from table.
2. Use the object table from menu to choose between contains or is within, depending on the geographic relationship between objects in the two tables.

Polygons "contain" points, lines, or other polygons. Points, lines, and small polygons are "within" other (larger) polygons.

3. Click OK.

Join Tables

Menu Path

Table > Join Tables

Option Enabled If ...

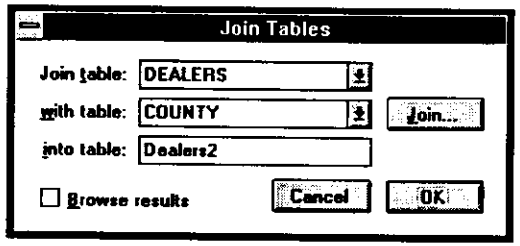
Two or more tables are open.

Purpose

Join Tables allows you to join data in two tables.

Using Join Tables

Join Tables creates a relational join between two tables. You could use it, for example, to join a StatInfo table to a mappable table, such as States. The resulting table is a query table and, as such, it is temporary. You can use File > Save Copy As to create a permanent version of the joined table.



To use Join Tables:

1. Use the dialog's Join table menu to specify one of the tables.
2. Use the dialog's with table menu to specify the other table.
3. When you want to type a name for your query table in the into table box Selection is the default name.
4. Browse Results should be checked if you want to browse the query table.
5. Click OK.

When MapInfo executes Join Tables, it attempts to figure out how to match the records in the two tables. When it is successful, the join proceeds automatically. When it is not successful, MapInfo indicates that the "autojoin failed." In this case you should click on Join. A dialog is displayed that allows you to tell MapInfo how to make the join. (See the entry on Join.)

Note: When the join is complete, all of the rows in the joined table (into table) and the Join Table are selected.

What Happens When Tables Are Joined

When there is a one-to-one correspondence between rows in the two tables, the resulting table joins the columns of one table to the columns of the other. When one table has more records than the other, what happens is more complex. The best way to understand this is with an example. We have two tables, a COUNTY table with three records and a DEALERS table with eight records.

The next illustration shows a Browser of COUNTY. The table has four fields: County, Total, Afro_American, and Hispanic.

COUNTY Browser

County	Total	Afro_American	Hispanic
GOLIAD	4679	502	0
GONZALES	293	37	372
GRAY	1210	0	1357

records 1 - 3 of 3

The DEALERS table has three fields: Dealer, County, and Sale.

DEALERS Browser

Dealer	County	Sales
Acme Ltd.	Gray	87307.90
Springers Dry Goods	Goliad	22224.66
The Space Place	Gray	9840.73
Mendez & Mendez	Gonzales	94352.99
Bob White Wings	Goliad	238.56
Twin's Speakers	Gonzales	1007.70
Lothario & Lesage	Gray	6346.76
The Try Works	Gonzales	5453.56

records 1 - 8 of 8

When these two tables are joined, the resulting table has eight records and all of the columns from the two tables:

Dealers2 Browser

County	Total	Afro_American	Hispanic	Dealer	Sales
GOLIAD	4679	502	0	Bob White Wings	238.56
GOLIAD	4679	502	0	Springers Dry Goods	22224.66
GONZALES	293	37	372	Twin's Speakers	1007.70
GONZALES	293	37	372	The Try Works	5453.56
GONZALES	293	37	372	Mendez & Mendez	94352.99
GRAY	1210	0	1357	The Space Place	9840.73
GRAY	1210	0	1357	Lothario & Lesage	6346.76
GRAY	1210	0	1357	Acme Ltd.	87307.90

records 1 - 8 of 8

Since there are two dealers in Goliad county, the joined table must have two entries for Goliad county. Similarly, there are three dealers in Gonzales county and three in Gray county. Consequently, the joined table has three records for those two counties.

Join Tables vs. Append

Join Tables and Append are quite different.

When you append one table to another, you are simply adding rows to a table. The tables you are appending must have the same set of columns, in the same order. Appending tables does not give you more information about each row. It simply increases the number of rows in a table.

When tables are joined, the result is quite different. You join tables precisely because one table does not have all the information, all the columns, you want in its rows. You join another table to it in order to get that information.

Label Axis

Menu Path

Graph > Label Axis

Option Enabled If ...

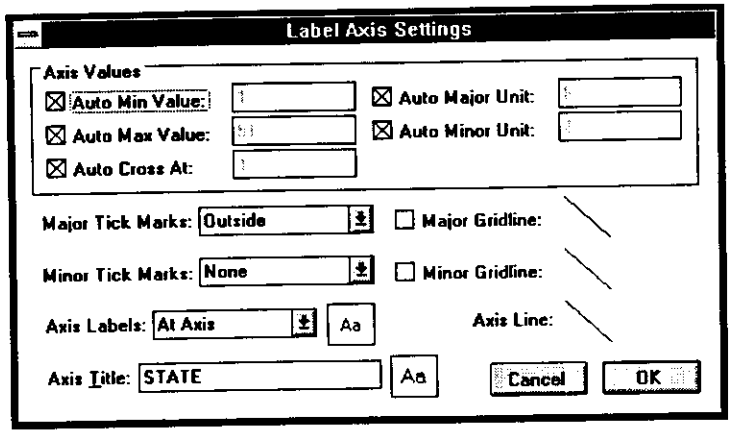
A Grapher is the active window.

Purpose

Allows you to customize the label axis of your graph.

Using Label Axis

The label axis is the axis that has the labels of the data values being graphed. For example, in a typical financial graph, the label axis might have "1st Qtr", "2nd Qtr", and "3rd Qtr" while the value axis might have dollar amounts. For a graph in normal orientation (not rotated), the label axis is the X, or horizontal, axis.



The Label Axis dialog works like the Value Axis dialog. For an explanation of the dialog, see the entry for Value Axis.

Label Tool

Menu Path

Tool palette

Tool Enabled If ...

A Mapper is active and one layer (not the cosmetic layer) is selectable.

Purpose

The Label tool (upper case "L" with a small arrow pointing to the right) allows you to label objects with information from the related database.

Using the Label Tool

Click on an object with the Label tool, and a label appears. When you click CONTROL [Option] when you are using the Label tool, MapInfo ignores the first selectable layer and labels objects according to the second selectable layer. So, if you had a Mapper of states, counties, and towns, in that order from bottom to top, each with its selectable option turned on, and you attempted to label an object while holding down the CONTROL [Option] key, MapInfo would skip over the first selectable layer (in this case, towns), and label the second selectable layer, counties.

Setting Selectable Layers

When you use the Label tool, MapInfo labels objects according to the first layer in the Layer Control dialog that has its selectable option toggled on. Therefore, if you have a layer of states and a layer of counties, both with the selectable option turned off, and a layer of towns with its selectable option turned on, MapInfo reads down the list until it finds the layer that has its selectable option turned on, in this case towns.

Label Options in Layer Settings

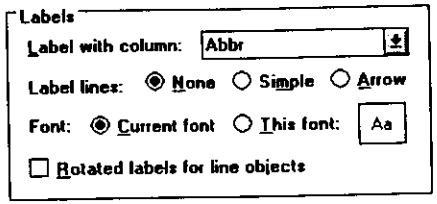
The Layer Settings dialog allows you to specify the following label options:

- The column to use for labeling
- The font
- The font size

To set a layer's label options:

1. Choose Layer Control from the Map menu.
2. Choose the layer that you want to label from the list and click on Settings.
3. Use the Layer Settings dialog to set the label options for that layer.

In the Labels section of the Layer Settings dialog, you have several labeling options:



Label with column: Use this option to determine the contents of labels.

Label lines: This option allows you to set label lines, that is, lines from labels to the object labeled. Label lines only appear after you move the label from the place where it was originally created.

Font: Allows you to set the font for labels.

Rotated labels for line objects: Check this option when you want MapInfo to rotate labels to follow the course of a line object.

For more information on these options, see the entry on Layer Settings.

Removing Labels

MapInfo places labels in the cosmetic layer. You can erase one or more labels, reposition them, change the text style of a label, or move the labels to another layer.

To eliminate all labels:

1. Choose Clear Cosmetic Layer.

To eliminate one or several labels:

1. Make the cosmetic layer editable.
2. Choose the label or labels you want to eliminate.
3. Click the <DELETE> key or choose the Edit > Clear option and the selected labels are erased.

Moving Labels

To move a label:

1. Make the cosmetic layer editable.
2. Choose the label with the Select tool and keep the button down.
3. Now drag the cursor. When you have set label lines, a line extends from the label to its original position.

To move the labels from the cosmetic layer to another layer:

1. Choose Save Cosmetic Objects.
2. Using the dialog boxes that display, move the labels to the currently editable layer or create a new table in which to place the labels.

Changing a Labels Style

To change the style of a label:

1. Make the cosmetic layer editable. (When the label is in another layer, make that layer editable.)
2. Double-click on the label with the Select tool.
3. Use the options in the Text Object dialog to change the style of the label.

Layer Control

Menu Path

Map > Layer Control

Option Enabled If ...

A Mapper is the currently active window.

Purpose

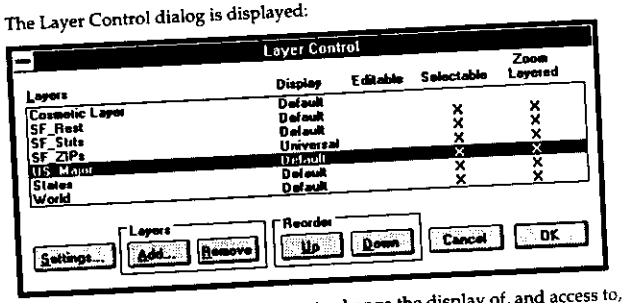
Layer Control allows you to determine how the various tables in a Mapper are displayed as layers.

Layer Control Dialog

To access the Layer Control dialog.

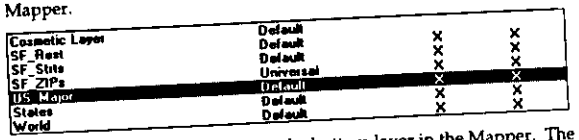
- Choose Layer Control from the Map menu>

The Layer Control dialog is displayed:



The Layer Control dialog allows you to change the display of, and access to, the active map. You can determine whether layers are displayed at all, and decide whether information in them is selectable or editable. You can set zoom layering, reorder layers, control the display colors, add and remove layers, and specify label preferences.

The Layer Control box displays a list of the layers in the current Mapper and indicates whether each is editable, selectable, or zoom layered. (See entry on Layer Settings.) Layers are stacked in a Mapper. The order of layers in the box is the order of the layers in the Mapper.



The bottom layer in the list is also the bottom layer in the Mapper. The cosmetic layer is always the topmost layer. Thus, the above list indicates that the World table is the bottom layer in the Mapper, with States on top of it, US_Major on top of States, and so forth. When there are more layers than can be displayed in the box at once, scroll bars appear at the right.

To work with a layer, select it in the box by clicking on it with the cursor. You can then click on Settings to display the Layer Settings dialog.

The Layer Settings dialog lets you set attributes for the selected layer. (You can also access the Layer Settings dialog by double-clicking on the desired layer in the file list box in the Layer Control dialog.)

You can also:

Layers (Add/Remove): When you want to add a layer to the Mapper, click Add. MapInfo displays a menu where you choose the table you want to add. Remove clears the selected layer from the map window.

Reorder (Up/Down): Clicking these buttons moves the selected layer up or down one position in the list. The layers are drawn from bottom to top; the bottom layer in the list is the first one drawn, and so forth. The order essentially determines which layers obscure the contents of the other layers; the bottom layer in the list is the one most obscured.

Layer Settings

Menu Path

Map > Layer Control > Settings...

Option Enabled If ...

You are in the Layer Control dialog.

Purpose

Layer Settings allows you to set display, edit, zoom, and label settings for a layer.

Using Layer Settings

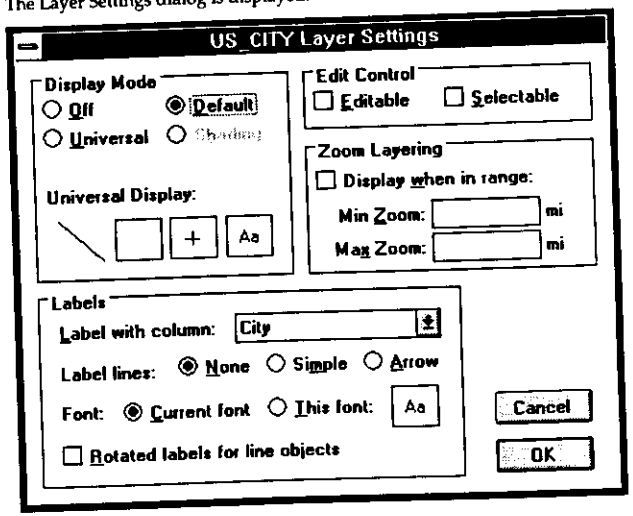
To access the Layer Settings dialog:

- Choose Settings from the Layer Control dialog

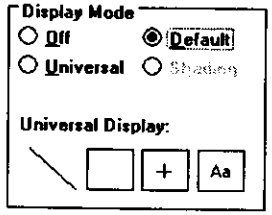
or,

- Double-click on the desired layer in the file list box in the Layer Control dialog.

The Layer Settings dialog is displayed:



Display Mode



The display can be set to Off, Default, Universal, or Shading.

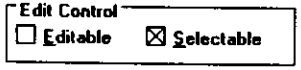
Off: When set to Off, the layer will not be drawn.

Default: When set to Default, the layer is drawn by the values stored with the objects in the map database file.

Universal: When set to Universal, the objects are drawn as specified by the universal sample in the dialog. You can change the universal samples by clicking on the appropriate fill, line, and text icons.

Shading: When set to Shading, the layer is drawn as set by the Shade by Value command.

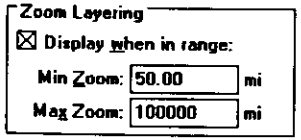
Edit Control



You can specify whether a layer is editable. When you draw objects, they are drawn to the editable layer. When you paste from the clipboard into a Mapper, MapInfo pastes into the editable layer. Objects in the editable layer can be moved, recolored, deleted, etc. Only one layer can be editable at a time.

When you choose an editable object, edit handles appear at the four bounding corners of the object. You can also set a layer to be selectable. In order to choose objects, label objects, or use the Info tool on objects, the layer must be selectable. Several layers can be selectable at the same time, although you can only create a Selection from one layer at a time.

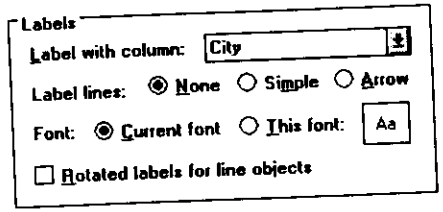
Zoom Layering



Display when in range: Check to activate Zoom Layering, which specifies the scale range where a layer is visible in a map. The minimum and maximum zoom layer at which the layer is visible is set in the Zoom Layering box. For example, if you want your street map to

be visible only when you are zoomed in closer than three miles, you would set the minimum zoom to 0 and the maximum zoom to 3.

Labels


Labels
Label with column: City
Label lines: None Simple Arrow
Font: Current font This font: Aa
Rotated labels for line objects

Label with column: Use this menu to determine the content of labels when the Label tool or Draw Autolabels is used. When you choose Expression (from the bottom of the menu) MapInfo displays the expression dialog, which you can use to build expressions.

Label lines: Use this option to choose None, Simple, or Arrow. (The arrow option produces an arrow pointed toward the place where the label originated.) Label lines do not show when labels first appear. However, if you choose a label and then move it, a line of the selected type goes from the label to the place where it first appeared. To move a label:

1. Make sure the cosmetic layer is editable (Settings, in Layer Control)
2. Click on the label and drag it.

Font: There are two Font options: Current font or This font. This Font is a font that you can customize by clicking on the font symbol (box containing an uppercase and lowercase letter "A"). You can also choose a font style, font size, and font color from the menus.

When you are using Windows 3.1, TrueType fonts look the best for drawing rotated labels on the screen. On a Macintosh, you get the best results by using Adobe Type Manager and choosing a PostScript font. When you are printing with a PostScript printer, most fonts look good when rotated.

Expressions for Setting Labels

You can use expressions to set your map labels. Expression 1 (below) causes the county name to be displayed in proper form (that is, first letter uppercase, the rest lowercase) while expression 2 causes the county name to display in all capital letters.

1. `Proper$(County)`
2. `Upper$(County)`

Expression 3 has two columns in it, County and Population.

3. `Proper$(County) + Chr$(13) + Str$(Population)`

We use the Str$ function to convert the population value into a character string so that the string concatenation operator (+) can operate on it. "Chr$(13)" inserts a carriage return into the string, thus breaking it into two lines. The resulting label looks like this:

Cambria
47,934

Expression 4 is like expression 3, except that it inserts a colon into the label.

4. `Proper$(County) + ":" + Chr$(13) + Str$(Population)`

The resulting label looks like:

Cambria:
47,934

Expressions 5 and 6 return the lowest address number and the highest address number, respectively, for street segments in a StreetInfo table.

5. `Minimum(FromLeft, FromRight)`
6. `Maximum(ToLeft, ToRight)`

Expression 7 creates a label containing the address range for a street segment.

7. `Str$(Minimum(FromLeft, FromRight)) + " - "`
   `Str$(Maximum(ToLeft, ToRight))`

A space, a dash, and a space are inserted between the two numbers. Expression 8 creates a two-line label with the street name on the first line and the address range on the second line.

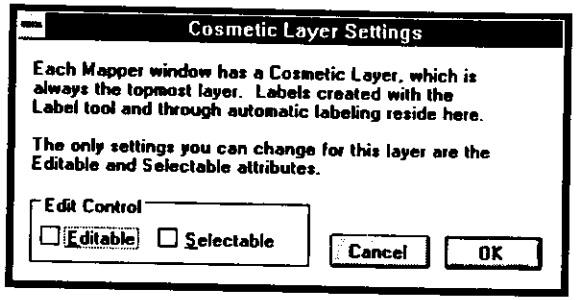
8. `Proper$(Street) + ":" + Chr$(13) + Str$(Minimum(FromLeft,`
   `FromRight)) + " - "Str$(Maximum(ToLeft, ToRight))`

The resulting label looks like this:

Van Antwerp Av:
131 - 154

Cosmetic Layer Settings

For the cosmetic layer, you can only control whether it is editable or selectable. Use this dialog:


Cosmetic Layer Settings
Each Mapper window has a Cosmetic Layer, which is always the topmost layer. Labels created with the Label tool and through automatic labeling reside here.
The only settings you can change for this layer are the Editable and Selectable attributes.
Edit Control
Editable
Selectable
Cancel
OK

Layout

Menu Path

Window > Layout

Option Enabled If ...

Always.

Purpose

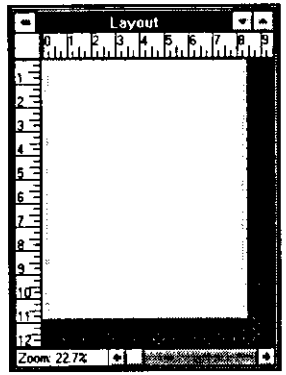
Layout allows you to arrange and annotate the contents of one or several windows for printing.

Using Layout

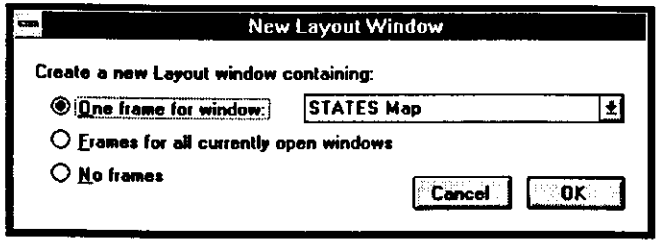
To display the Layout window:

1. Choose Layout from the Window menu.

When no windows are open, MapInfo creates a blank Layout.



When there are windows open, MapInfo displays the New layout Window:



2. Choose one of the options and then Click OK.

When you have made your choice (the options are explained below), MapInfo opens and displays that Layout.

When MapInfo first opens a Layout, it sets the page size and orientation (portrait or landscape) according to the current setting for your printer. When you later open that Layout when the printer setup is different, the Layout uses the page size and orientation for that printer setup. The sizes and positions of objects in the Layout are the same, but the way the Layout is broken into pages is different.

After you create a Layout, that Layout is the currently active window. MapInfo places the Layout option on the menu bar. Use the Layout menu to choose options for working with Layouts.

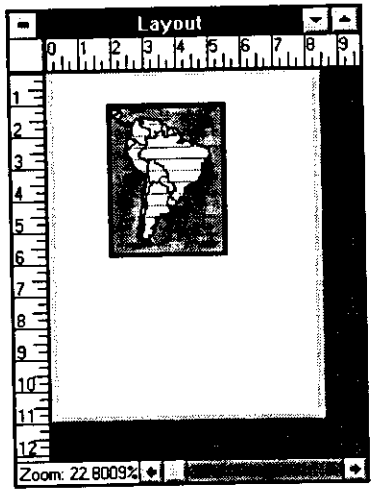
One frame for window: When you choose this option, you should use the dialog's menu to pick the window you want to display in your Layout. MapInfo then creates a Layout with the chosen window displayed in a frame centered in the Layout. A Grapher always gets a legend. A Mapper gets a legend When it is been thematically shaded. You can reposition the legend When you want.

Frames for all currently open windows: When you choose this option, MapInfo creates a Layout where all of the open Mappers, Browsers, and Graphers (along with a legend for the currently active Mapper or Grapher) are placed in the Layout in the same positions and sizes they have on your screen. You can then reposition and resize them.

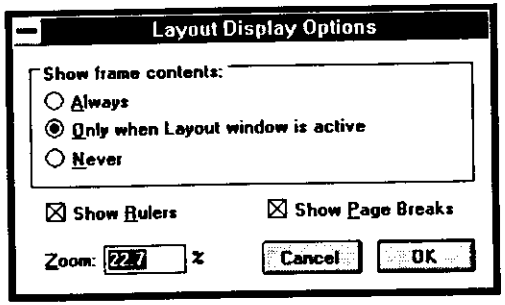
When you choose this option, close all of the windows that you are not going to use before you open your Layout.

No frames: When you choose this option, MapInfo creates a blank Layout. You can use the Frame tool to manually place Mappers, Graphers, their legends, and Browsers into the Layout.

Layout Window Description



Layout windows have scroll bars at the right and at the bottom like Mappers and Browsers. You can display rulers at the top and to the left to help you in positioning, sizing and aligning objects. The Zoom displayed in the key (lower left) indicates the magnification factor that is currently applied to the Layout. When the zoom is 37.46%, then the Layout is being displayed 37.46% of its actual size. When the zoom is at 123%, then the Layout is being displayed at 123% of its actual size. When you click on the key, MapInfo displays the Layout Display Options dialog.



Use the display options to:

- Set the conditions under which the contents of frames display
- Toggle the rulers on and off
- Set whether or not page breaks are shown
- Change the current zoom

For information on these options, see the entry on Display Options.

Tools in Layouts

You can use the following tools in Layout windows:

- Select tool
- Grabber
- Zoom-in
- Zoom-out
- Text tool
- Symbol tool
- Line tool
- Polyline tool
- Polygon tool
- Ellipse tool
- Arc tool
- Rectangle tool
- Rounded Rectangle tool
- Window Frame tool

These tools function the same in a Layout as they do in a Mapper, except for the Window Frame tool, which does not work in Mappers.

Front-to-Back Ordering of Objects

The objects in a Layout—frames, text, lines, rectangles, and so forth—are ordered from front to back. Think of each object as being drawn on a separate transparency, with the transparencies being stacked, one in front of the other.

This is most obvious in the case of two objects that overlap in space. An object that overlaps another object is said to be in front of it. This is also true for two objects that do not overlap: one of them is in front of the other. To determine which one is in front, you can move one object so that at least part of it occupies the space that is currently occupied by the other object,. When it is in front of the other object, it overlaps it; when it is behind the other object, it is overlapped by it.

This front-to-back ordering is initially determined by the order in which the objects were created. The most recently created object is in front of all other objects. You can change this order using the Bring to Front and Send to Back menu options. (See entries on Bring to Front and Send to Back for more information.)

Setting the Zoom Using Numerical Keys

You can use numerical keys <1> through <8> to set the zoom:

KEY	1	2	3	4	5	6	7	8
ZOOM	6.3	12.5	25	50	100	200	400	800

Just Click one of these keys when a Layout is the active window, and MapInfo changes the Layout's zoom.

Layout Size

Menu Path

Layout > Layout Size

Option Enabled If ...

A Layout is the active window.

Purpose

Layout Size allows you to set the number of pages and the margins for the current Layout.

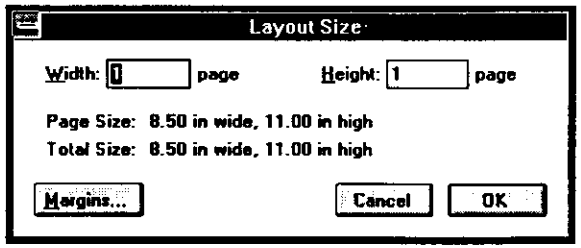
Using Layout Size

Setting the Number of Pages

To set the number of pages in the Layout:

1. Choose Layout Size on the Layout menu.

The Layout Size dialog is displayed:



2. Use the Width and Height boxes to set the number of pages.

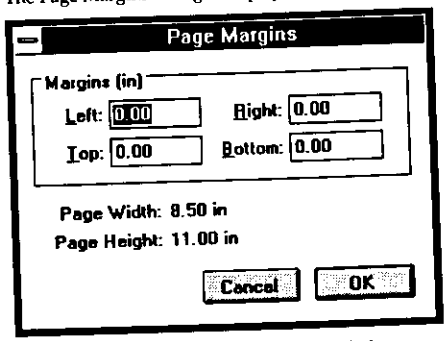
When you have a multi-page Layout various elements in your Layout may be distributed across two or more pages.

Setting Layout Margins for Individual Pages

In the majority of cases, there is no reason to change page margins from zero. However, if you want different margins:

1. Go into the Layout Size dialog.
2. Click the Margins button.

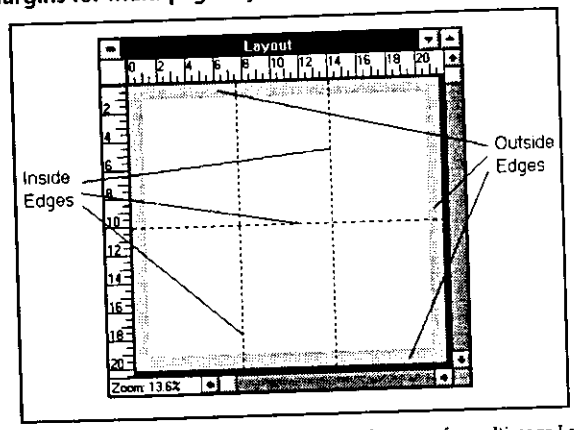
The Page Margins dialog is displayed:



3. Type the margin values into the dialog.

MapInfo indicates the margins by filling them with a gray border. The gray border merely serves to remind you where the margins are. When you put an object in the border, that object may print unless it is in an area on the page where the printer does not print.

Setting Margins for Multi-page Layouts



Margins apply to each individual page. In the case of a multi-page Layout, MapInfo displays the margins only on the outside edges of pages (see illustration above.) But, in displaying the Layout, MapInfo allows for the margins that go on the inside edges of pages. These margins do not display.

The illustration above shows a six-page Layout. The pages are 8.5 inches by 11 inches, and the margin for the Layout is one inch. The dotted lines indicating page breaks are drawn at page margins, not the edges of the component pages. This means that, while you can place

objects in the page margin areas falling on outside edges, you cannot place objects in page margin areas on inside edges. Those margin areas do not exist in the Layout.

Non-printing Area of the Page

When you are using a printer that cannot print to the full page, MapInfo grays the non-printing area If you have set the page margins to zero. For example, if your system is connected to a laser printer and you have set page margins to zero, you still see a small gray border at the edge of your Layout. That is the non-printing area of the page. Objects placed in the border zone will not print.

Paper Size

Note that MapInfo uses the paper size from your current printer settings. When you are set up to print to 8.5 inch by 11 inch paper in portrait orientation, it sets paper size to 8.5 inches wide and 11 inches high. When you are set up to print in landscape mode, it sets paper size to 11 inches wide and 8.5 inches high.

Regardless of the page size and orientation when a Layout was created, the Layout displays using the page size and orientation currently in effect. Therefore, if you originally created the Layout to print to a plotter on a sheet 34 inches by 44 inches, and you later open that Layout when you are connected to a laser printer set up to print on 8.5 inch by 11 inch paper, you see page break lines on the Layout.

Line Tool

Menu Path

Tool palette

Tool Enabled If ...

A Layout or editable Mapper is the active window.

Purpose

The Line tool allows you to create straight lines.

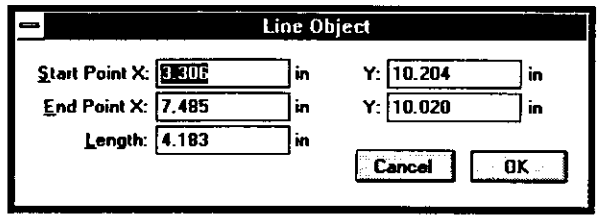
Using the Line Tool

To create a straight line:

1. Choose the Line tool from the Tool palette.
2. Move the pointer to where you want to begin drawing the line.
3. Click and hold down the mouse button, and drag the pointer. The line appears on the screen and changes length as you move the pointer.
4. Release the mouse button.

Holding down the <SHIFT> key while drawing a line constrains the line to horizontal, vertical, or 45-degree diagonal.

When you double-click on a line with the Select tool, its attributes dialog is displayed:



Specifying Line Object Attributes

Start Point: Indicated by the X and Y coordinate value.

End Point: Indicated by the X and Y coordinate value.

Length: The length of the line.

Map

Menu Path

Window > Map

Option Enabled If...

At least one mappable table (a table in which graphic objects are attached to the records) is open.

Purpose

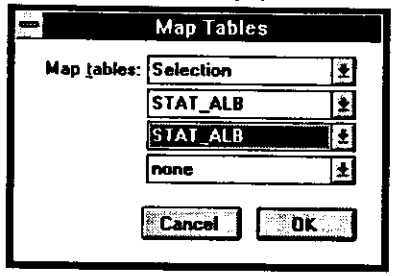
Map allows you to create a Mapper where you can view a table.

Using Map

To access the Map Tables dialog:

- Choose Map from the Window menu.

The Map Tables dialog is displayed:



The Map Tables dialog allows you to create a Mapper that draws up to four tables. Choose the table, or tables, that you want and click OK. Each table becomes a different layer in the Mapper. When a table you want to map is not on the list, you must open it first.

MapInfo draws the layers into the Mapper in order from the bottom (fourth line in the dialog box) to the top (first line in dialog box). Place your tables into the Mapper in an order that allows you to see everything. Do not place a table containing regions (such as states or counties) over a table containing only points (such as towns or cities) or lines (streets and roads). The regions would then hide the points and lines.

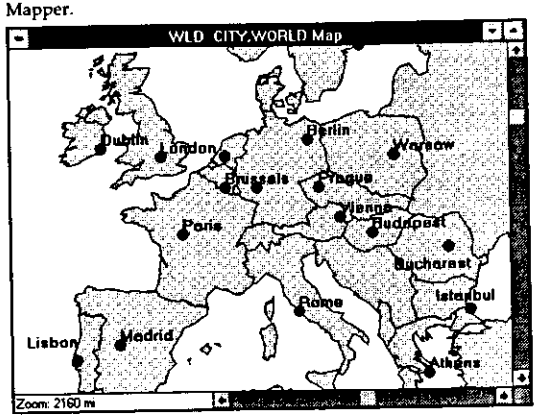
You can create a Mapper with more than four layers by adding additional layers with the Add Layer button of the Layer Control command on the Map menu.

After you create a Mapper, MapInfo makes it the currently active window. The Map option appears at the right end of the menu bar. Use it to choose options for working with Mappers.

Working with Mappers

Mappers give you a visual display of the spatial and geographic contents of tables. Used in conjunction with Browsers and Graphers, Mappers allow you to do sophisticated analysis with relative ease.

While Browsers and Graphers can only display information from a single table, Mappers can display information from many tables at once. Each table becomes a separate layer in the Mapper. MapInfo lists the tables in a Mapper in the Mapper's title bar. The tables are listed in descending order from left to right. The table farthest to the left is the table that is the top layer in the Mapper. The table farthest to the right is the table that is the bottom layer of the Mapper.



The Key

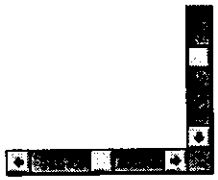
The key is the bar at the lower-left corner of the Mapper (i.e., Zoom 2160 mi). Depending on how it has been set, the key displays:

- Current zoom, that is, the distance across the Mapper. This is the default setting.
- Scale of the current map.
- Current position of the cursor.
- The length of a radius in a radius search.

When you click on the key, the Change View dialog is displayed. This dialog is also available through Change View in the Map menu. When this dialog displays, you can set various parameters of the map including:

- Display the current zoom, scale or cursor position in the key
- Change the zoom, scale, and the center point of the current map view
- Behavior of the map when you resize the window
  - Resize the map to fit the new window, keeping the view the same
  - Set the map to preserve the current scale, so that resizing the window has the effect of letting you see more or less of the map

Scroll Bars



You can use the scroll bars to move the map up, down, right, or left.

Sometimes you may scroll so far that you move your view completely off the map. When this happens the map appears to be blank. Simply activate Previous View or View Entire Layer from the Map menu. Either of these will return you to your previous view of the map, and you can reposition the map again.

Other Tools

The following table shows which tools are operative in a selectable Mapper and which are operative in an editable Mapper:

Tool	Selectable	Editable
Select	X	X
Grabber	X	X
Radius Search	X	X
Polygon Search	X	X
Zoom-in	X	X
Zoom-out	X	X
Info	X	X
Label	X	X
Text		X
Ruler	X	X
Symbol		X
Line		X
Polyline		X
Polygon		X
Ellipse		X
Arc		X
Rectangle		X
Rounded Rectangle		X
Frame too		
MapBasic tool		

MapBasic Tool

The MapBasic tool is used in conjunction with a MapBasic program, and its function is determined by that program.

Merge from Clipboard

Menu Path

Edit > Objects > Merge from Clipboard

Option Enabled If ...

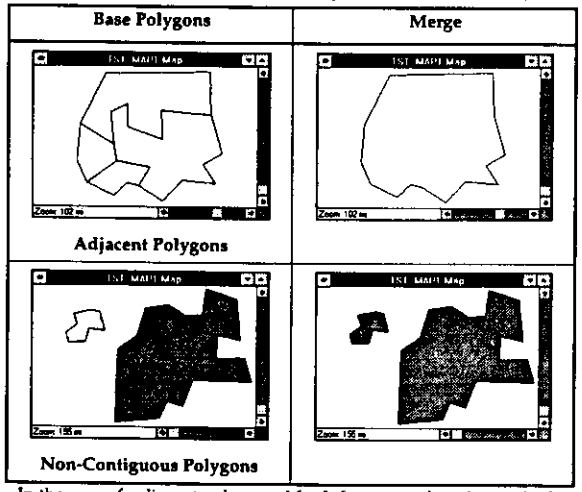
There is an editable layer in the active Mapper and at least one object in the Clipboard.

Purpose

Merge from Clipboard allows you to combine several polygons into a single region. It does not aggregate data associated with polygons being merged.

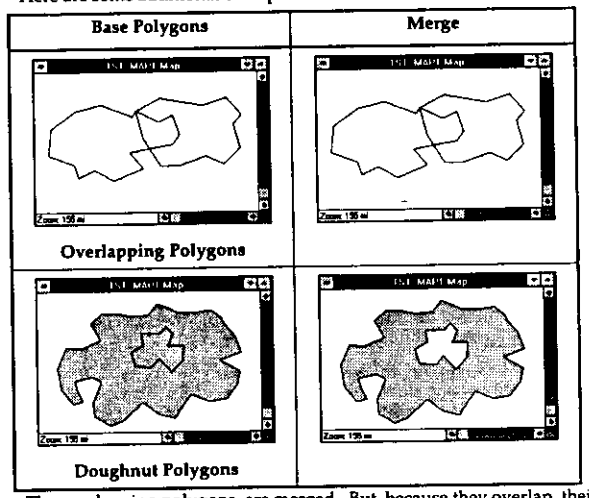
Using Merge from Clipboard

Merge From Clipboard allows you to merge the regions from your clipboard. You can also use it to subtract one region from another. It is a powerful tool with a variety of uses. The best way to understand how it behaves is to look at some simple examples. The following illustration shows how Merge from Clipboard treats various objects:



In the case of adjacent polygons, MapInfo merges them into a single polygon covering the combined area of the original polygons. In the case of non-contiguous polygons, MapInfo merges them into a single region containing several polygons. The component polygons remain physically separate on the map, but MapInfo treats them as one object. When you click on one component with the Select tool, the entire region is selected. When you use Shade by Value, the entire region is shaded as a single object.

Here are some additional examples:



The overlapping polygons, are merged. But, because they overlap, their original (overlapping) borders still display. The case of "doughnut" polygons is perhaps the most non-intuitive. There are two base polygons, one inside the other. When you merge them, MapInfo subtracts the smaller one from the larger one. In effect, it creates a hole in the larger polygon—hence the term "doughnut" polygon. This means that you can subtract one region from another using Merge from Clipboard.

Merging Objects

There are various ways to use Merge from Clipboard. You can select objects from any selectable layer in a Mapper and paste the merged object into the currently editable layer.

For example, let's say that you want to merge several objects into one and make the merged object replace the original object.

To do this:

1. Make the layer containing your objects editable (Map > Layer Control).
2. Choose the objects you want to merge.
3. Cut them to the clipboard.
4. Choose Merge From Clipboard.

MapInfo merges the objects and automatically pastes them back into the layer the original polygons came from.

Let's look at how the basic procedure would change if there are only two objects involved.

1. Make sure the layer containing your objects is editable (Map > Layer Control).
2. Choose one of the two object you want to merge.
3. Cut that object to the clipboard.
4. Choose the other object.
5. Choose Merge from Clipboard.

MapInfo merges the object on the clipboard with the selected object.

As a final example, let's look at a situation where there are several objects involved. Let's say that you want to merge several objects from one layer and place the merged object into a different layer.

To do this,

1. Make the layer containing the objects to merge selectable and the layer for the merged object editable (Map > Layer Control).
2. Choose the objects you want to merge.
3. Copy those objects to the clipboard.
4. Unselect the objects being merged (Analyze > Unselect All).
5. Choose Merge from Clipboard.

MapInfo merges the selected objects and places the merged object in the editable layer. In this case your original objects are preserved. They still exist in the layer you copied them from. The merged object is in a different layer.

Merge Using Column

Menu Path

Table > Merge Using Column

Option Enabled If ...

One table must be open.

Purpose

Merge Using Column allows you to merge regions based on the value of a column. It also allows you to simultaneously create many new polygons by merging polygons.

Preparing for Merge Using Column

In order to perform Merge Using Column, MapInfo needs some way of knowing which source polygons are to be grouped together and combined into a new polygon. MapInfo does this by looking at a specified column and grouping those polygons having the same value for that column.

Creating sales territories is a typical example. Imagine that you have sales information for each county in your state and you want to create a polygon for each of seven sales territories. You have seven sales representatives, one for each territory, with each county being assigned to one of them. The record for each county has information on sales, and it also lists the sales representative. So, when you combine your polygons, you direct MapInfo (by setting Group By Column in the Merge Regions Using Column dialog) to group counties together according to the sales representative. All counties with the same representative are combined into a single new polygon, a polygon thereby representing that representative's territory.

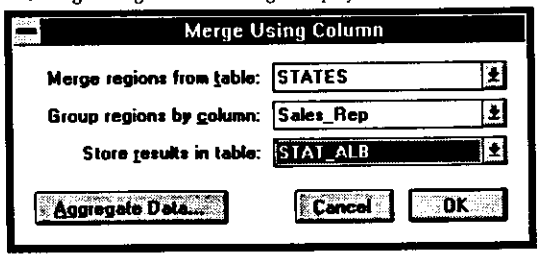
The key to simultaneously creating several polygons is in having an appropriate column for the Group By Column specification. When your base table does not already have such a column, you have to add one (using Modify Table's Columns) and then add data to the column. When that is done you are ready to create your new polygons.

Using Merge Using Column

To access the Merge Using Column dialog:

- Choose Merge Using Column from the Table menu.

The Merge Using Columns dialog is displayed:

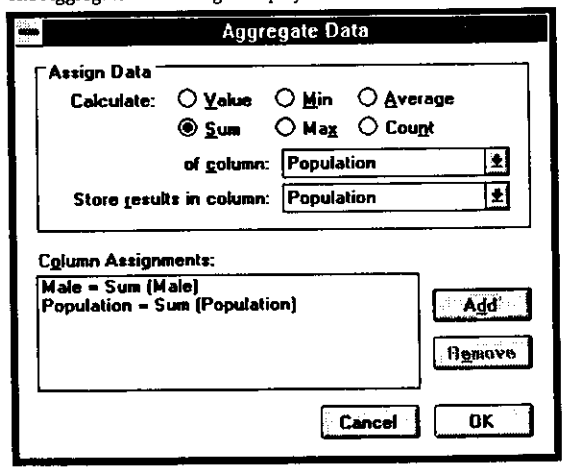


The source table is the table containing the polygons you are merging. The source table is referred to in the dialog as the Merge regions from table. The destination table is the table where you are going to place those polygons. The destination table is referred to in the dialog as the Store results in table. The destination table must be editable.

To use the Merge Using Column dialog:

1. Choose your source table from the dialog's Merge regions in table menu.
2. Choose your destination table from the Store results in table.
3. Choose a column in the source table from the dialog's Group region by column menu. MapInfo uses this column to group the source polygons and create destination polygons.
4. Click on Aggregate Data.

The Aggregate Data dialog is displayed:

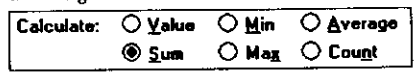


Aggregating Data

When you combine polygons that have data associated with them, you may need some way of combining the data from your several original polygons into a single data value for your new polygon. You do that by creating a data assignment statement for each column. Use the Aggregate Data dialog for creating your data assignment statements.

Creating Data Assignment Statements

Use the upper area of the dialog to create a data assignment statement. You have to create a separate statement for each column that you want to create aggregate data. MapInfo lists the data assignment statements in the box in the lower half of the dialog.



You must tell MapInfo how to aggregate the data from the base polygons.

Value: When a column contains only a character string (character data type), MapInfo selects this option by default.

When the column contains numerical data, you should choose one of the following five aggregate functions:

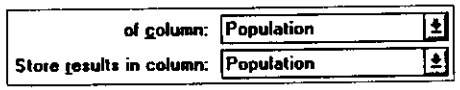
Sum: The combined polygon's value is the sum of the base polygon values.

Min: The minimum value from the various base polygon values is the value for the combined polygon.

Max: The maximum value from the various base polygon values is the value for the combined polygon.

Average: The average of the various base polygon values is the value for the combined polygon.

Count: The value for the combined column is the count of base polygons that were combined to create the column.



The data assignment exists between columns in the source table and columns in the target table:

Of column: This is a column in your source table. This is the data being aggregated.

Store results in column: This is a column in your target table. This is the aggregate values.

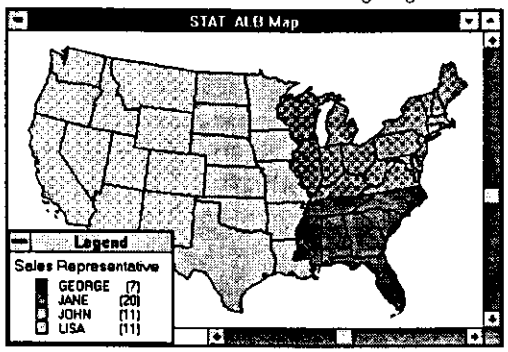
Add: Once you have set up your data assignment statement, click on Add to have it entered into the data assignment list.

Remove: When you want to remove a data assignment, click on the data assignment you want to remove and then click on Remove.

MapInfo removes it from the list.

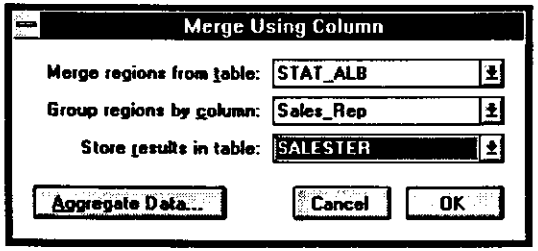
An Example of Creating Sales Territories:

To clarify how Merge Using Column works, let's look at an example. We have a table that contains various information about states, including the name of the sales representative for each state. The following map shows this table shaded according to sales representative. We want to create a new table that contains a single region for each of these different territories.



The new table is called SALESTER. Once we have created it (using Edit > New), we use Merge Using Column to create graphic objects and tabular data for it.

The following illustrates how information is entered in the Merge Using Column dialog.

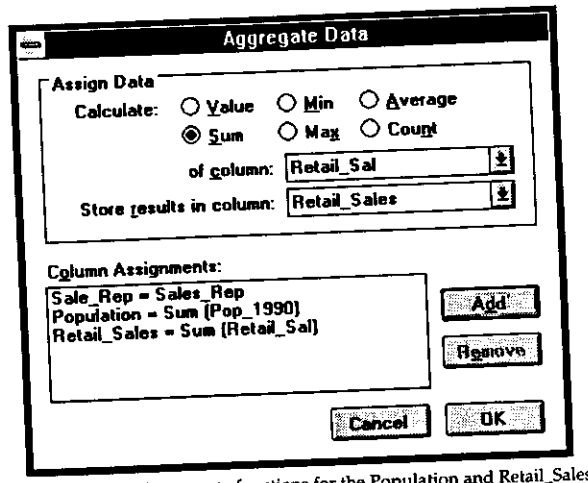


Merge regions from table: STAT_ALB is the table containing the objects and data we are starting with.

Group regions by column: We want to group the states by the Sales_Rep column so that we have new objects corresponding to territories for George, Jane, John, and Lisa.

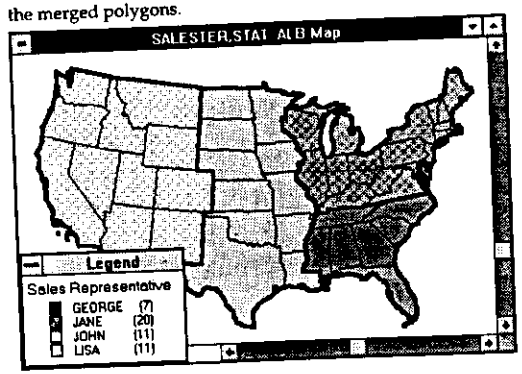
Store results in table: SALESTER is the table where the new objects and information are stored.

Since STAT_ALB contains data we want to have associated with our new objects, we need to aggregate that data. The next illustration shows the Aggregate Data dialog filled out with the appropriate data assignments.



Note the use of aggregate functions for the Population and Retail_Sales assignments. The population assignment adds up the population of all states having the same sales representative and places that total in the Population column of SALESTER. Similarly, the Retail_Sales for SALESTER is the sum of statewide sales from STAT_ALB.

When MapInfo completes the merge, SALESTER has four graphic objects. The Mapper below shows SALESTER superimposed on STAT_ALB. The heavy outlines are the border of the merged polygons.



The browser below shows the aggregated data for the sales territories.

SALESTER Browser

Sale_Rep	Population	Retail_Sales
George	40463199	361974.36
Jane	109225999	1113905.09
John	44039471	459104.92
Lisa	50468002	678399.55

records 1 - 4 of 4

Modify Structure

Menu Path

Table > Modify Structure

Option Enabled If...

At least one table is open.

Purpose

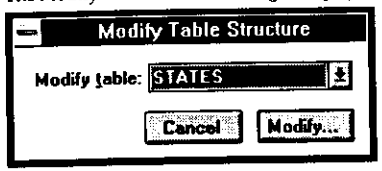
Modify Structure allows you to change the structure of a table (add, remove, or reorder fields, add and remove indexes, or add graphic objects).

Using Modify Structure

To access the Modify Table Structure dialog;

1. Choose Modify Structure from the Table menu.

The Modify Table Structure dialog is displayed:



2. Click on the dialog's Modify table menu.

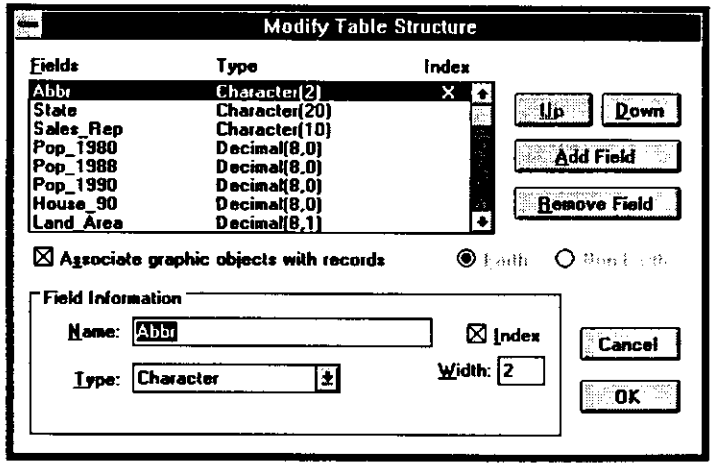
A list of available tables is displayed.

3. Choose the table you want to modify.

Once you have chosen a table.

4. Click on Modify.

A second Modify Table Structure dialog is displayed:



This dialog is identical to the Create Table Structure dialog displayed in File > New. For more information, refer to the entry for New.

Remarks

When a Grapher or Browser is on the screen while you are modifying its table, it closes on completion of the Modify. Similarly, Graphers or Browsers showing selections from a table close. Any Mapper layer based on a table being modified is removed from the Mapper. When it is the only layer in the Mapper, the Mapper closes.

Be sure there's enough disk space to store a copy of the table temporarily. When the table is 365 kilobytes, you need at least 365 kilobytes of free disk space to modify the table.

You cannot modify the structure of a query table or an SQL view table. When you want to work further with such tables, you must first use Save Copy As. That creates a permanent table. You can then modify the structure of that permanent table.

New

Menu Path

File > New

Option Enabled If...

Always.

Purpose

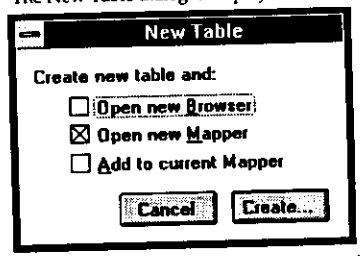
New allows you to create a new table. MapInfo tables have a graphic (mappable) component and a data (browsable) component. The New option allows you to set up these components.

Using New

To access the New Table dialog.

- Choose New from the File menu.

The New Table dialog is displayed:



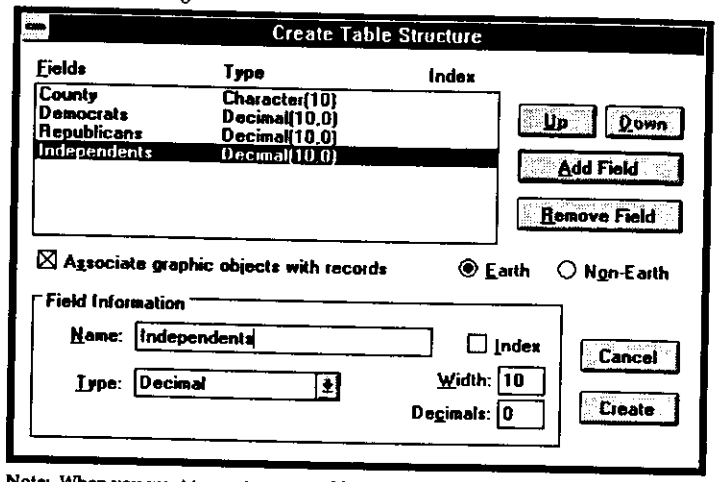
You can choose none or any combination of the following options:

- Open new Browser
- Open new Mapper
- Add to current Mapper

When you choose Open new Browser, MapInfo opens an empty Browser of the table once you have finished specifying the table structure. When you choose Open new Mapper, MapInfo opens a new Mapper when you are done specifying the table structure. When you choose Add to current Mapper, MapInfo adds the table as a layer in the currently active Mapper. The table has the same projection as the Mapper that it is added to.

Create Table Structure

Once you have made your choices in the New Table dialog, MapInfo displays the Create Table Structure dialog.

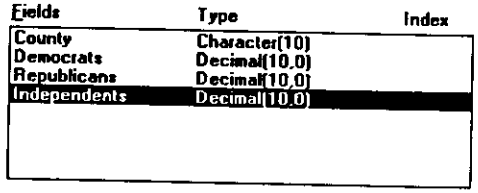


Note: When you want to create a mappable table and begin drawing without specifying data fields, you can simply enter one data field into Create Database Structure and then create your table. Later on you can use Table > Modify Structure to add the data fields you want.

Use the Create Database Structure dialog to specify the field name, field type, number of characters (width), and whether or not the field is to be indexed for each field in your new database. Collectively, this information is the structure of your database. Note that all tables must have at least one field. Therefore, even if you do not need any data fields, you should create one anyway.

You also indicate whether or not to associate graphic objects with records and, if so, whether the map is to be an earth or a non-earth map (See the discussion on earth and non-earth maps later in this section.)

At the top of the Create Table Structure dialog is a box that lists the fields in order from top to bottom. This box contains the following information:



To choose a field from this box, click on its name and the field is highlighted.

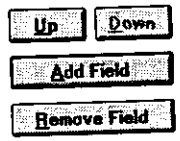
MapInfo displays its information in the Field Information box at the bottom of the dialog.

Name: This column contains the names of the fields (columns) in the table.

Type: Indicates the type of field with the number of characters in the field listed in parentheses (where applicable).

Index: An "X" in this column indicates the field is indexed. When the column is blank, the field is not indexed. You can index as many fields as you want. Indexing does not change the order of records. But, you need it to:

- Use Analyze > Find, which only works on an indexed field
- Speed up queries containing numerical and alphabetic comparisons
- Speed up joins

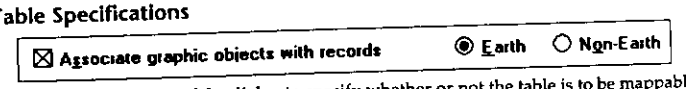


Up/Down: Click on these buttons to move the selected field up or down one position in the list box. The file structure is reorganized accordingly. When a table displays in a Browser, the first field becomes the leftmost column, the second field becomes the second column from the left, and the last field becomes the rightmost column. Moving a field up or down has the effect of moving it left or right in a Browser.

Add Field: Click this button to add a new field at the bottom of the list. This field has a default name of field1, field2, field3, etc., depending on the order in which the field was created.

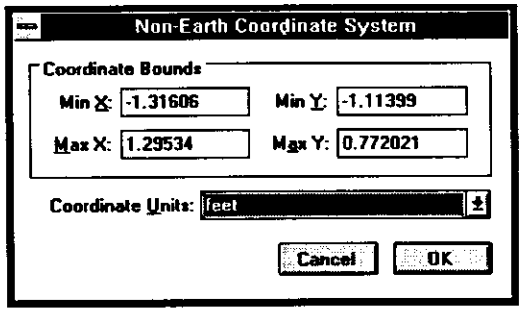
Remove Field: Click this button to remove the selected field from the table.

Setting Table Specifications

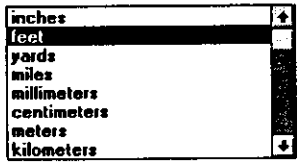


Use the middle area of the dialog to specify whether or not the table is to be mappable and whether the map is to be an earth or a non-earth map. An earth map contains objects that have a particular location on the earth's surface. Coordinates of earth maps are referenced to positions on the earth's surface. A non-earth map contains objects that have no specific location on the earth's surface, such as a floor plan. Coordinates in non-earth maps are not referenced with respect to the earth's surface. When you have a building outline that you want to overlay on a street map, you need to create the outline in an earth map.

When you make a non-earth map and have completed working with Create Table Structure, the Non-Earth Coordinate System dialog is displayed:



This dialog allows you to specify the bounds and units for your non-earth coordinate system. You can use positive or negative numbers to specify the minimum and maximum X and Y values. The following coordinate units are available:



For example, if you want to create a floor plan that is 20 inches wide and 10 inches high, you should choose inches for the coordinate units. You would enter the following numbers for the bounds should be entered:

Min X: 0 Min Y: 0

Max X: 20 Max Y: 10

You want to make the bounds larger than necessary to allow for future expansion.

Note: You cannot create objects outside the bounds of a map, and you cannot increase the bounds of an existing map.

New Record

Menu Path

Browse > New Record

Option Enabled If...

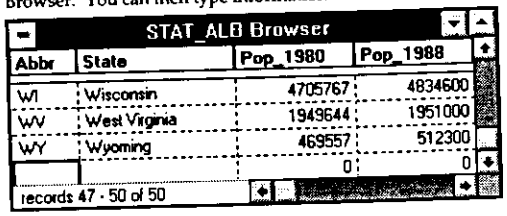
Browser must be open for a table you can edit. You cannot edit read-only tables, such as ASCII tables, Excel and Lotus spreadsheets, or StreetInfo tables.

Purpose

New Record allows you to add a blank record at the bottom of the active Browser.

Using New Record

When you choose New Record, MapInfo adds a blank record at the bottom of the active Browser. You can then type information into this record.



Open

Menu Path

File > Open

Option Enabled If ...

Always.

Purpose

Open allows you to open a table for use.

Before Opening a Table

Before you open a table, it is important that you take the time to read the following sections: :

Opening vs. Importing

You must open a table before you can use it. Open activates a dialog for opening tables. Choose the appropriate table by double-clicking on it in the dialog box.

Most programs require you to import files created in some other programs. MapInfo allows you to work directly with files created in other programs. When you have a file in one of the following non-MapInfo formats, you do not have to import it:

- dBASE DBF
- Delimited ASCII
- Lotus 1-2-3
- Microsoft Excel

By not importing data you save time; opening a file is quicker than importing it. You also save disk space. When you import a file, you make a copy of it. Since MapInfo works directly with files from other programs, it does not have to make a copy.

When MapInfo opens a file from some other program, it creates a file with a ".tab" extension (on Macintosh, ".Table" or no extension at all). This file describes the format of the file that actually contains the data. When you have opened a non-MapInfo file, such as a Lotus file, in a previous session and attempt to open it again,the following prompt appears:

Table definition already exists. Overwrite it?

The table definition referred to is the .tab file. It does not hurt anything if you continue on. MapInfo overwrites the .tab file and open's the file.

Working with Excel, Lotus, and ASCII Files

While you can work directly with Excel, Lotus, and ASCII files, there are some limitations. MapInfo can only save data in MapInfo and dBASE/FoxBASE formats. This means that you can only read information from Excel, Lotus, and ASCII files.

When you want to do any of the following tasks, you should first use Save Copy As to save the file in MapInfo's format. The copy is a MapInfo-format table, and you can treat it as any other MapInfo table.

- Edit information from one of these files
- Add new columns to one of these files through Modify Structure
- Use Update Column to calculate new data values and place them into the file
- Use Modify Structure to add graphic objects to the file

For more information of working with spreadsheet files, see the section entitled, Opening Spreadsheet Files, later in this section.

Graphics Files

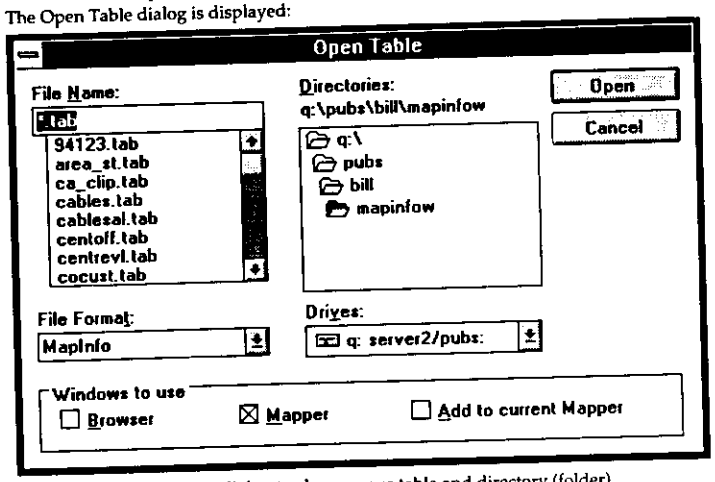
In the case of graphics files, the data must be imported (through the Import command in the Table menu) before it can be used with MapInfo. MapInfo can import files in the DXF format and MapInfo for DOS files (and PICT format on the Macintosh). For more information, see the entry on Import.

Using Open

To access the Open Table dialog:

- Choose Open from the File menu

The Open Table dialog is displayed:



Use the upper part of the dialog to choose your table and directory (folder).

File Format: Use this menu to specify the file type for the table you are opening. The tables displayed are tables in MapInfo format or non-MapInfo files that have previously been opened in MapInfo. When you want to use a file in one of the other formats that MapInfo recognizes, choose that format from this menu .

MapInfo currently opens the following file types:

- MapInfo
- dBASE DBF
- Delimited ASCII
- Lotus 1-2-3
- Microsoft Excel

For dBASE/FoxBASE, Delimited ASCII, Lotus 1-2-3, and Microsoft Excel files, MapInfo displays other dialogs, prompting for further information. These dialogs are described on the following pages.

Window To Use: When you open a table, you have the option of either displaying the table in a Mapper or Browser or opening the table without displaying it.

When you check Browser, MapInfo displays the table in spreadsheet or tabular form. When you check Mapper, MapInfo displays the table in a new map window. The Add to current Mapper option is only available when there is a Mapper currently displayed. When you check this option, the table is displayed as the topmost layer of the active Mapper. When there are no map windows open, the Add to current Mapper option is grayed out.

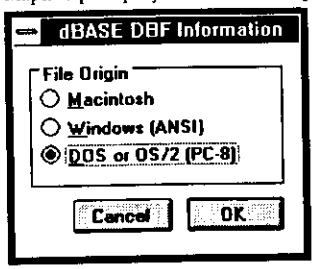
When you open a new table, MapInfo displays the table as a Mapper by default, unless you change the default in File Preferences under Preferences in the Edit menu (Edit > Preferences > File Preferences). It may take MapInfo several seconds or more to open and display a complex map. When you do not need to see the entire map immediately, you can interrupt the redraw by pressing <ESCAPE> [<COMMAND PERIOD>].

Tables without graphic objects cannot be opened in a Mapper. When either of the Mapper options is checked, nothing happens. When you want to map a table that is currently without graphic objects, you must do one of the following:

- Geocode the table
- Use Modify Structure to make the table mappable and then add graphic objects
- Join the table to a mappable table in Shade by Value or SQL Select

Opening DBF Format Files

Several different character sets are commonly used in computing. MapInfo needs to know which one your file is in. Since these different character sets are used for different platforms, MapInfo prompts you to indicate the platform on which a given DBF file was created:



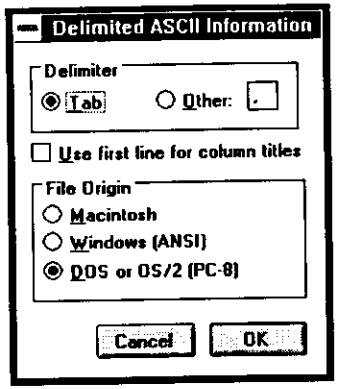
Once you have chosen one of these options, MapInfo opens the file.

Opening Delimited ASCII Files

In order to open a delimited ASCII file, MapInfo needs three pieces of information:

- Which character is used to separate one field from another
- Whether or not to treat the first line of the file as column titles
- File Origin

The Delimited ASCCII Information dialog allows you to enter this information:



Delimiter: To specify the field delimiter, choose Tab or Other. When you choose Other, you should also type the character in the box. Comma is the default choice.

File Origin: The File Origin information has the same significance here that it does in opening DBF files.

Opening Spreadsheet Files

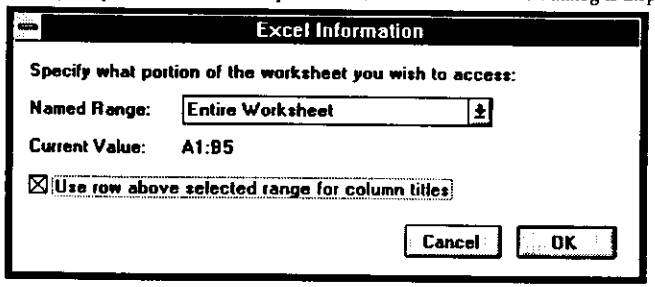
When working with spreadsheet files you have to be careful about the structure of your spreadsheet. Spreadsheets are not organized into records and fields the way databases are. However, since MapInfo is organized as a database, it reads spreadsheet files as through they were database files. When MapInfo reads a spreadsheet file it treats spreadsheet rows as records and spreadsheet columns as fields. Everything in a spreadsheet row is treated as through it were data about a single object. And all the items in a spreadsheet column are treated as though they were the same type of data about different objects.

This last assumption has further consequences. In databases, the type of data to be found in a particular field is explicitly declared in the database structure. Since spreadsheets allow any type of data in any cell, there are no such explicit declarations. Thus when MapInfo reads a spreadsheet it determines the type of data by examining the data itself. Since it treats columns as database fields, it assumes that every cell in the column contains the same type of data.

Further, MapInfo reads the column width as set in the spreadsheet and only reads the number of characters that fit the width. When a column width has been set to 9 and it contains the label "Sales Forecast", MapInfo truncates that label to Sales For".

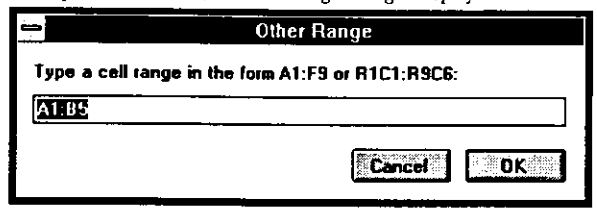
One last thing to note is that in those cells where your spreadsheet contains formulas, MapInfo only reads the values calculated by those formulas. It does not read the formula itself.

When you open a Lotus or Excel spreadsheet, the Excel Information dialog is displayed:



Named Range: Use this menu to specify Entire Worksheet or Other.

When you choose Other, the Other Range dialog is displayed:



Type the desired cell range into the box.

In the Excel Information dialog shown above, you can specify that the row above the selected range be used for column titles. Click on the box to choose this option.

Note: For more information on opening files, consult your platform-specific MapInfo manual.

Pack

Menu Path

Table > Pack

Option Enabled If ...

At least one table is open. You cannot pack information in a query table, an SQL view table, or an SQL group by results table.

Purpose

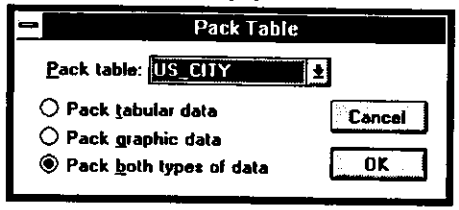
Allows you to pack MapInfo tables so that they use less disk space.

Using Pack

To access the Pack Table dialog:

- Choose Pack Table from the Table menu

The Pack Table dialog is displayed:



When you choose Pack, MapInfo displays a dialog where you choose the file to be packed. You can also choose which data you want packed, tabular data, graphic data, or both.

Since MapInfo tables are usually a mixture of text and graphics, Pack lets you specify that aspect of the table you want to pack. Packing a file's graphic information has the consequence of making graphic operations a little slower in that file. This is because MapInfo now has to do a little more work to display the graphic image; you are sacrificing processing speed for disk space. Alternatively, if you have just created a MapInfo file by performing an Import operation, you may want to pack the graphic data.

Packing tabular information simply removes deleted records, making the table smaller, with no loss in speed. To unpack the table, simply export the table and reimport it.

Remarks

Make sure there is enough disk space to handle a copy of the database as a scratch file.

Paste

Menu Path

Edit > Paste

Option Enabled If ...

The Browser is active. The table must be editable and there must be text in the clipboard. You cannot paste text into a query browser.

The Mapper is active. A layer must be editable, and an object must be in the clipboard. MapInfo for Macintosh users can also paste images from PICT files, as long as the image is in the clipboard.

The Grapher is active, the option is never enabled.

Purpose

Paste allows you to copy the contents of the clipboard into the file being edited.

Using Paste

When you are pasting text into a Browser, position the text cursor at the point where you want the text to be pasted.

When pasting into a Mapper, the object is pasted to the currently editable layer. If you are pasting an object with geographic coordinates, the object is pasted to those coordinates. For example, When you are pasting a copy of New York State onto a new map, New York is pasted to the position where New York belongs.

When text or an object is currently selected, it is replaced by the object being pasted into the table.

Pick Fields

Menu Path

Browse > Pick Fields

Option Enabled If ...

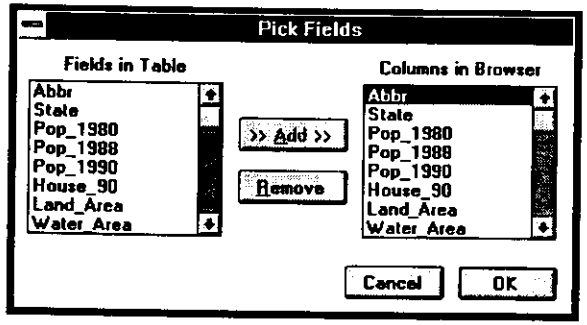
A Browser is the active window.

Purpose

Pick Fields allows you to choose which fields display as columns in a Browser.

Using Pick Fields

Pick Fields displays a dialog that allows you to choose which fields you want to be visible in the Browser. When you choose Pick Fields, MapInfo displays a dialog that contains (on the left) a list of all the fields in the table being browsed and (on the right) a list of all the columns currently in the Browser.



1. Choose fields in the Fields in Table list and click Add to add them to the Browser.
2. Choose columns from the Columns in Browser list and click Remove to remove them from the Browser.

Pick Fill

Menu Path

Style > Pick Fill

Option Enabled If ...

Always

Purpose

Allows you to set the default fill pattern and color and change the fill pattern and color of objects being edited.

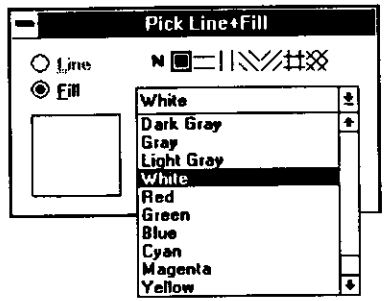
Using Pick Fill

To access the Pick Fill dialog:

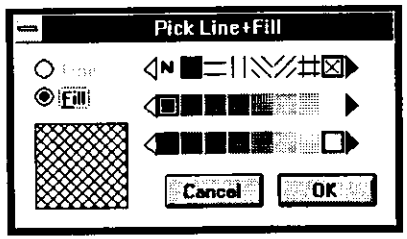
- Choose Pick Fill from the Style menu.

The Pick Line+Fill dialog for a monochromatic monitor or color monitor is displayed:

Pick Fill for a Monochromatic Monitor



Pick Fill for a Color Monitor



The method for choosing different colors for fills, symbols, and fonts depends on the kind of monitor you are using. If you are using a color monitor, MapInfo provides you with a color palette that consists of a row of squares, each shaded a different color. Use the black triangles on either end to maneuver through the color palette. To choose a color, click on the corresponding square.

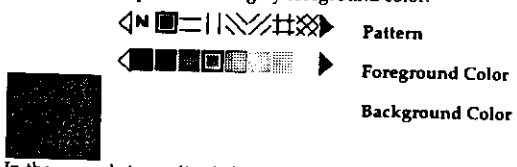
When you are using a black and white display (or a color monitor with a monochromatic display), MapInfo provides you with a menu of color options. Although these colors appear as various shades of gray on your screen, they print in the correct color when you are using a color output device.

To change the pattern in an existing object, choose the object by clicking on it. Click on the appropriate pattern and color in the Fill Picker. The object's fill style changes. You can choose multiple objects and change their fills the same way.

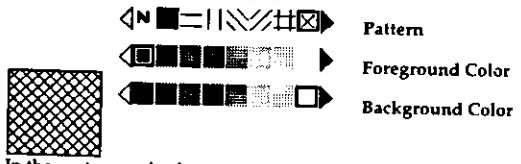
To set a pattern and color for objects you are about to create, click on the appropriate pattern in the Pattern Picker. Every fillable object you create is filled with the pattern you selected.

Pattern, Foreground Color, and Background Color

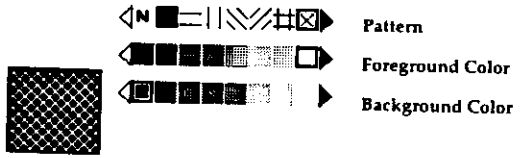
When choosing a fill style, you choose a fill pattern from the first palette, the foreground color from the second palette, and the background color from the third palette. When you choose the solid pattern, no background color is available. When you choose an item from the pattern or color palettes, the item is surrounded with a square. The following illustration shows the solid pattern and a gray foreground color.



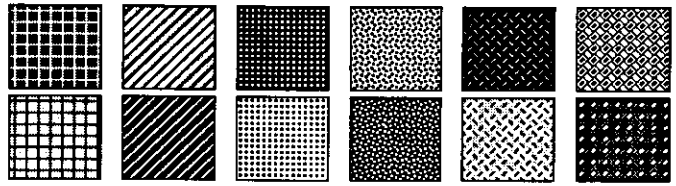
In the example immediately below, the pattern is a diagonal cross-hatch, the foreground color is black, and the background color is white. The foreground color is applied to the part of the pattern that displays as black in the pattern palette. The background color is applied to the part of the pattern that displays as white.



In the next example, the pattern is the same as the first, but the foreground and background colors are reversed.

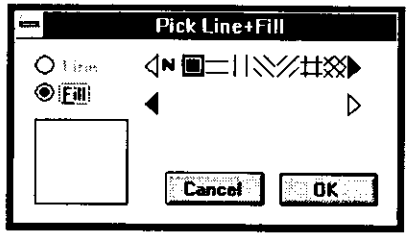


The following examples show several sample pairs where the pattern is the same but the foreground and background colors are different:



Creating Custom Colors

You can create custom colors and add them to your picker. To do this, scroll all the way to the right until you see color in the palette:



When you click on a spot in that area, the "color creator" for your platform displays. Use it to blend a custom color. That custom color is then available.

You can use this same procedure to change any of the colors already in the palette. Click on the color and change it.

How Changing Fill Styles Takes Effect

You can only change the fill style of an editable object. The fill style for an object is the style it has when displayed in a layer that has its Display Mode set to Default (Map > Layer Control > Settings).

The following kinds of objects have fills: ellipses, rectangles, rounded rectangles, and polygons. Fill style has no effect on text or symbols. To change them, use the Font Picker and the Symbol Picker/respectively.

When you choose an object from an editable layer, the Fill palette is reset to match the fill style of the chosen object. When you draw another object, it has the new fill style.

Pick Font

Menu Path

Style > Pick Font

Option Enabled If ...

Always.

Purpose

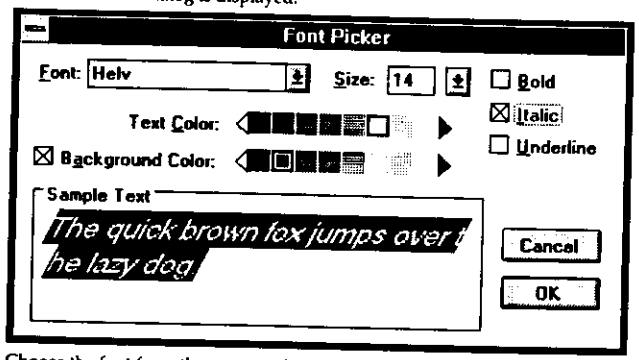
Pick Font allows you to choose a font for your text.

Using Pick Font

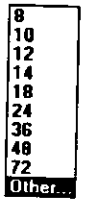
To access the Font Picker dialog:

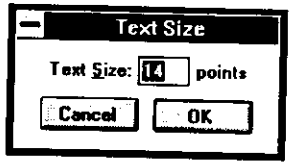
- Choose Pick Font from the Style menu.

The Font Picker dialog is displayed:



Choose the font from the menu at the top and the point size from the menu to the right. When you want to use a point size other than those listed on this menu, choose Other and type the desired size into the box that appears.





You determine the type style from the check boxes at the right. Clicking in a blank box activates a style feature, while clicking in a checked box deactivates the style feature. Available features: **Bold**, *Italic*, Underline.

If you are running on a color machine, you can also choose the color of the text or the text background. If you are placing text on a colored background and do not want it to appear on a white rectangle against the color, you should specify a matching color as the background color for the text.

As you perform these operations, the Sample Text window displays a sample of your type style.

How Changing a Font Takes Effect

When you choose a text object from an editable layer, the font palette is reset to match the font style of the chosen text. When you create another text object, it has the new text style. If, instead of creating another text object, you choose a new font style, the font and style of the chosen text object changes.

Pick Font has no effect on symbols, lines, or fills. To change them, use the Pick Symbol, Pick Line, and Pick Fill, respectively.

Pick Line

Menu Path

Style > Pick Line

Option Enabled If ...

Always.

Purpose

Pick Line allows you to set the default line style and change the line style of objects being edited.

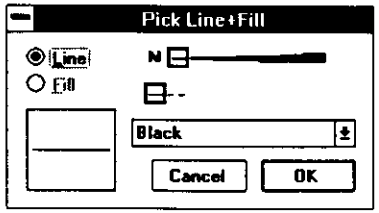
Using Pick Line

To access the Pick Line + Fill dialog:

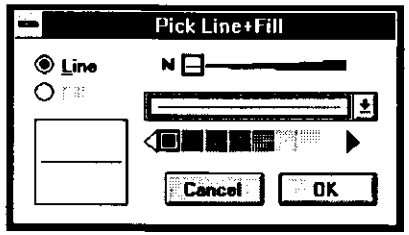
- Choose Pick Line from the Style menu.

The Pick Line + Fill dialog for a monochromatic or color monitor is displayed:

Pick Line for a Monochromatic Monitor



Pick Line for a Color Monitor



Pick Line displays the Line palette, which allows you to choose the color, width, and style (e.g., dashed) of the pen MapInfo uses. As you change the various attributes of the line style, a sample line is displayed in the left part of the dialog. Click OK to choose the line style.

Specifying Line Thicknesses

You can specify line thicknesses ranging from "no thickness" (represented by the letter N) to very thick. Each increment represents one screen pixel of thickness. When you specify "no thickness," the line does not appear (and accordingly, the other style attributes disappear

from the dialog). Click on one of the samples to choose a line thickness. MapInfo surrounds the chosen thickness with a box.

Choosing a Line Style

Some of the line styles display in red. Others have some sections that display in red and other sections that display in black or gray. Whatever displays in red accepts the color you specify in the Pick Line + Fill color dialog. Whatever displays as black or gray on the menu displays that way on the screen or when printed.

Choosing Line Color

When you are using a color monitor, there are more colors available than can fit in the dialog at one time. In this case, the color chosen is presented in a list that scrolls right/left. Solid black triangles allow you to scroll through the list. To scroll right, click on the triangle that lies to the right of the color spectrum; to scroll left, click on the triangle that lies to the left of the color spectrum. When you reach either end of the list (i.e., when you can scroll no further in that direction), the appropriate triangle appears "hollow."

When you are working on a black and white monitor, MapInfo displays a pull-down menu listing available colors. Of course, as long as you are working on a black and white monitor, you won't be able to see any colors but black and white. However, when you choose other colors, you see them when you display the map on a color monitor or when you print it on a color printer.

How Changing Line Styles Takes Effect

When you have chosen an object in an editable layer, choosing a line style from the Line+Fill Picker changes:

- The line style of lines, polylines, and arcs
- The edge style of polygons, ellipses, rectangles, and rounded rectangles

Line style has no effect on text or symbols. To change them, use the Font Picker and the Symbol Picker, respectively.

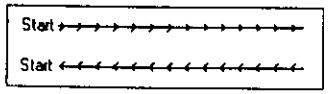
When you choose an object from an editable layer, the Line palette is reset to match the line style of the chosen object. When you then draw another object, it has the new line style. The Line+Fill Picker does not have to be visible on the screen for this to happen.

Notes on Line Styles

The line styles up to the first double-line style work with any printer or plotter. The double-line styles do not work with plotters. That is because they are drawn as a thinner white line on top of a thicker black line. Plotters cannot "blank out" the center of the black line with the white line.

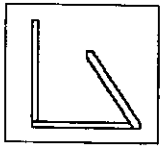
Some of the thicker line styles do not look good on the screen, but are fine when printed out.

Two of the line styles have arrows. In the first one on the menu (upper line in the illustration below), the arrows point from the starting point of a line to its endpoint when you are drawing lines, polylines, and polygons. The arrows go clockwise for rectangles and rounded rectangles and counter-clockwise for ellipses and arcs. In the second arrow style (lower line in the illustration), the arrows go in the opposite direction: from the endpoint of a line to its starting point when you are drawing lines, polylines, and polygons; counter-clockwise for rectangles and rounded rectangles; and clockwise for ellipses and arcs.



When the arrows are going in the wrong direction for an existing object, simply switch from one arrow style to the other.

Lines start over for each object. Look at the following graphic, consisting of three separate lines that touch one another:



When you look at the points where the lines meet, you can see that the lines overlap. The "hollow" part of the line style does not continue seamlessly from one line to the next.

When you want double-line streets, they look awkward when you use one of the double-line styles because you see line ends for each street segment. A more effective technique is to display the streets table twice in a Mapper. On the bottom streets layer, use a thick black line. On the top streets layer, use a thin white line.

Show Line+Fill Picker

When you frequently need to respecify the line style, you may find it inconvenient to have to pull down the Style menu each time. To save time, you could use the Show Line+Fill Picker option (from the Style menu). This places a Line+Fill Picker window on the screen, where you can use it repeatedly—without going back to the Style menu.

Pick Symbol

Menu Path

Style > Pick Symbol

Option Enabled If ...

Always.

Purpose

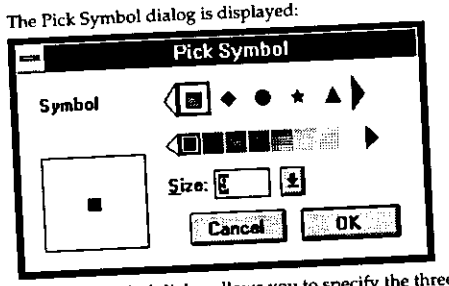
Allows you to display and choose symbols from the Pick Symbol dialog. These symbols can be used to indicate the locations of various places (e.g., customer locations, hospitals, fire hydrants etc.).

Using Pick Symbol

To access the Pick Symbol dialog:

- Choose Pick Symbol from the Style menu.

The Pick Symbol dialog is displayed:



The Pick Symbol dialog allows you to specify the three things that make up a symbol style:

1. The shape (chosen in the upper-right part of the dialog)
2. The color (chosen in the middle-right part of the dialog)
3. The size (chosen in the lower-right part of the dialog)

As you change these attributes of the symbol style, a sample symbol is displayed in the left part of the dialog. Once you are satisfied with your symbol, click on OK. Conversely, when you decide that you want to revert to the symbol style that was used before you activated Pick Symbol, click on Cancel.

Picking a Symbol

1. Scroll through the symbols by clicking on the arrows at either end of the top line.

When you are at the end of the list, the arrow turns hollow.

2. Click on the symbol you want.

MapInfo encloses the symbol with a square.

If you need to respecify the symbol style frequently, you may find it inconvenient to have to pull down the Style menu each time. To save time, you could use the Show Symbol Picker option (from the Style menu). This places a Symbol Picker window on the screen that can be used repeatedly — without going back to the Style menu.

How Changing Symbol Styles Takes Effect

When you have chosen a symbol (or symbols) in an editable layer, choosing a symbol from Pick Symbol changes only that symbol (or symbols).

Pick Symbol has no effect on lines or regions. To change them, use the Pick Line+Fill (Styles > Pick Line, Styles > Pick Fill).

When you choose an object from an editable layer, the Symbol palette is reset to match the symbol of the chosen object. When you create another point object, it has the symbol style.

Polygon Tool

Menu Path

Tool palette.

Tool Enabled If...

An editable Mapper is active.

Purpose

The Polygon tool allows you to draw polygons one side at a time.

Using the Polygon Tool

1. Choose the Polygon tool from the Tool palette.

The cursor becomes a small cross.

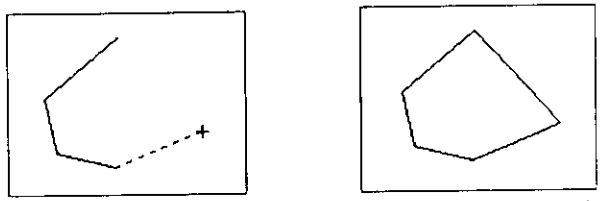
2. Move the pointer to where you want to begin drawing and click the mouse button once. Drag the pointer to draw the first side or line.
3. Click the mouse button once when you want to terminate the current line and continue drawing another line from that endpoint.

Continue doing this for each additional side, point and click, and a new line appears between the previous end-point and the new point that you selected.

4. When you want to stop, double-click on the last end point.

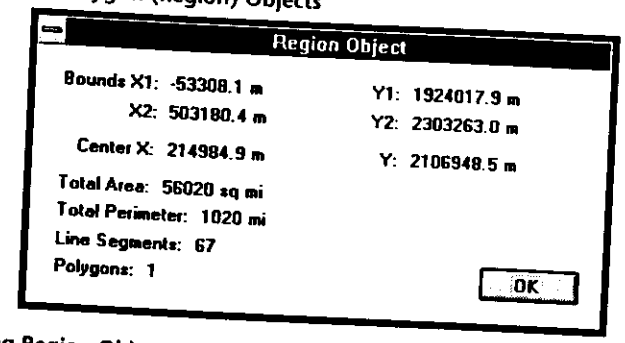
MapInfo draws the last side of the polygon for you, automatically connecting it with the starting point. MapInfo fills the polygon with the default pattern. For example, when you want to draw a triangle, you can draw two lines in a V shape, then double-click. MapInfo draws a line to close the shape.

When you hold the <SHIFT> key down while drawing a polygon, the line segments are constrained to horizontal, vertical, and 45-degree diagonal.



In the drawing at the left, three sides have been completed and a fourth, the dotted line, is complete as soon as you click the mouse button. Notice that the cursor has become a crosshair. The righthand drawing shows the completed polygon.

Attributes of Polygon (Region) Objects



Specifying Region Object Attributes

Bounds X1 and X2: These are the left and right boundaries, respectively. Y1 and Y2 are the top and bottom boundaries, respectively, of the region's minimum bounding rectangle (the smallest rectangle that can fully enclose the region).

Center X, Y: The coordinate values for the center of the polygon or region. MapInfo considers the center of the polygon to be the center of its minimum bounding rectangle.

Polygons: This indicates how many polygons make up the chosen region. There are maps where an object consists of more than one polygon (for example, the state of Massachusetts has many islands) but is still considered one object. This attribute tells you how many polygons are in the chosen object.

Total Line Segments: The number of line segments in the polygon.

Total Perimeter: Total perimeter of the line segments.

Total Area: Total area of the polygon.

Remarks

When you want to draw a region consisting of more than one polygon:

1. Draw each polygon with the Polygon tool.
2. Select all polygons.
3. Use Merge Polygons to join the separate polygons into one region.

You can add, delete, and move nodes by going into Reshape mode once a polygon is chosen. See the entry on Reshape.

Polygon Search Selector Tool

Menu Path

Tool palette

Tool Enabled If ...

A Mapper is active.

Purpose

The Polygon Search Selector tool allows you to search for and choose all the objects within a given region.

Using the Polygon Search Selector Tool

The Polygon Search Selector tool chooses all objects within any polygonal region on the map, such as a state or county boundary, a police patrol district, a sales territory, and so forth. When the region is a complex one, with several component polygons, it includes all the component polygons in its search.

In order for the Polygon Search selector to work, two layers must be set as selectable:

- The layer containing the objects you are searching for
- The layer containing the region you want to search within

These can be the same layer.

When you set your layers properly, click on the regions you want to search, and MapInfo selects all the objects (points, lines, polylines, or other regions) within that region. Once MapInfo determines that an object is within the selected polygon, and selects it, it only selects further objects from the same layer as the first object.

If you do not have a boundary layer available, simply make the cosmetic layer editable and draw a region in it with the Polygon tool. Then select that region with the Polygon Search tool. Once you have chosen the search region, MapInfo searches for objects within that region. It searches for objects in the topmost selectable layer it can find things in.

For example, if you want to see all the crimes committed in a particular patrol district, both the patrol districts layer and the crime locations layer must be selectable. To select all the crimes committed in Central Park, just click on the Central Park region with the Polygon Search Selector. Similarly, if you want to select all customers in Texas, the customer locations layer and the states layer must be selectable. Click on Texas, and MapInfo highlights all the customers.

There may be occasions when you want to work with more than one layer of regions. In this situation, MapInfo ordinarily chooses the topmost layer when you click on the Mapper with the Polygon Search tool. When you hold the <Contro!> [Option] key down while using the Polygon tool, the tool searches a region in the next layer down. When you click twice while holding the <Control> [Option] key down, the tool uses a boundary two layers from the top; when you click three times, the tool uses a boundary three layers from the top; and so forth. In this way you can work with several layers of boundaries.

Polyline Tool

Menu Path

Always.

Tool Enabled If ...

An editable Mapper is active.

A Layout window is open.

Purpose

The Polyline tool allows you to create polylines (a connected sequence of lines that is not closed).

Using the Polyline Tool

1. Choose the Polyline tool from the Tool palette.
2. Move the pointer to where you want to begin drawing and click the mouse button once.
3. Move the pointer to draw the first side or line.
4. Click the mouse button once if you want to terminate the current line and continue drawing another line from that endpoint.
5. Continue doing this for each additional side, point and click, and a new line appears between the previous end point and the newpoint that you select.
6. Double-click on the last endpoint to stop,.

When you hold the <SHIFT> key down while drawing a polyline, the line segments are constrained to horizontal, vertical, and 45-degree diagonals.

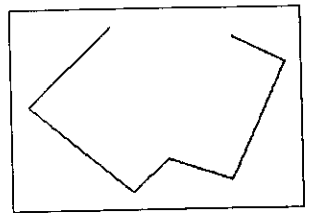
Drawing a Curved Line

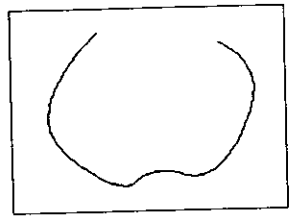
The curved line procedure is similar to the polyline procedure.

1. Choose the Polyline tool and draw a figure.
2. When you are done, double-click on the object to bring up its attribute box.
3. Check the Smooth box.

MapInfo smooths your polyline into a curve. To unsmooth the object, uncheck the box.

Alternatively, you could select the figure and choose Edit > Objects > Smooth. Unsmooth turns a curved line or shape into an angular one (see the polylines below).



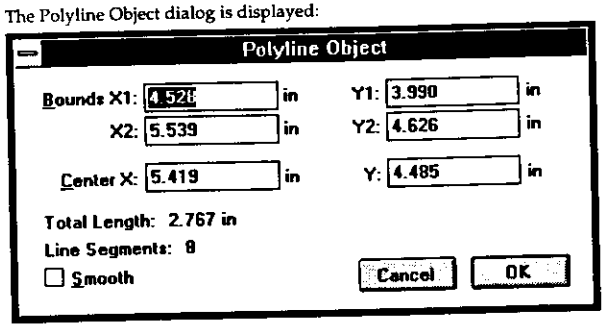


Attributes of Polyline Objects

To access the Polyline Object dialog:

- Use the Select tool and double- click on the object.

The Polyline Object dialog is displayed:



Specifying Polyline Object Attributes

Bounds X1 and X2: These are the left and right boundaries, respectively. Y1 and Y2 are the top and bottom boundaries, respectively, of the polyline's minimum bounding rectangle (the smallest rectangle that can fully enclose the polyline).

Center X, Y: The coordinate of the midpoint of the middle segment. When there is an even number of segments, the middle segment is defined to be segment N/2 + 1, with N equal to the number of segments. So if you had eight segments, MapInfo would report the center of the fifth segment, or 8/2 + 1.

Total Length: Total length of the line segments.

Line Segments: The number of line segments in the polyline.

Smooth: Check it when you want to smooth the polyline, making it into a continuous curve.

Remarks

You can add, delete, and move nodes by going into reshape mode once a polyline is chosen. See entry on Reshape.

Preferences

Menu Path

Edit > Preferences

Option Enabled If ...

Always.

Purpose

Preferences allows you to choose which group of preferences in the Preference's dialog you want to view or change. The Preference's dialog has three general groups of preferences:

- System settings
- File settings
- Map settings

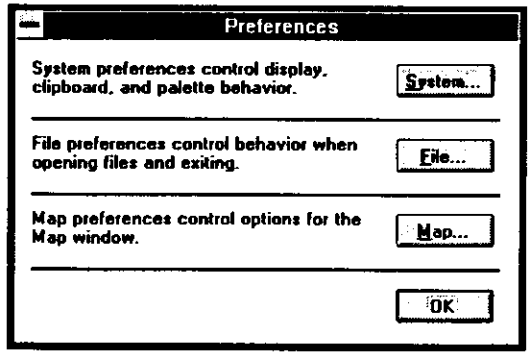
MapInfo retains these preferences from session to session.

Using Preferences

To access the Preference's dialog:

- Choose Preferences from the Edit menu.

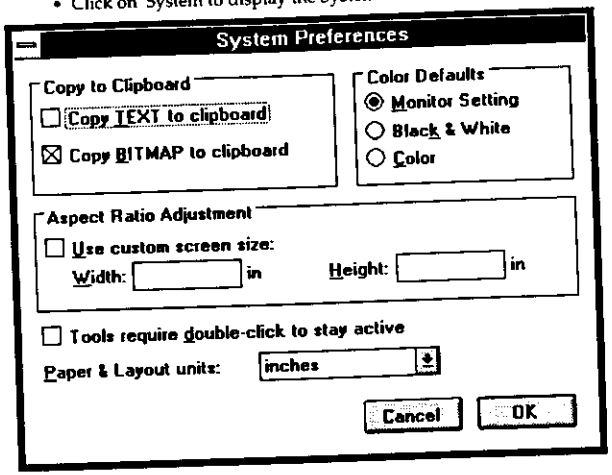
The Preferences dialog is displayed:



When you choose one of the three groups of preferences, MapInfo displays a dialog in which you can change the appropriate settings.

Setting System Preferences

- Click on System to display the System Preferences dialog:



Copy to Clipboard

This preference controls what information is transferred to other applications through the clipboard. By default, when an object is cut or copied to the clipboard, both the text and the graphics are copied. When you do not want text copied to the clipboard during Cut and Copy operations, uncheck the Copy TEXT to clipboard option. When you do not want graphics copied to the clipboard during Cut and Copy purposes, uncheck the Copy BITMAP to clipboard [Copy PICT to clipboard] option.

When you copy records from MapInfo onto the clipboard and then paste them into a word processor, you probably paste the text information and lose the graphics. When you want to Paste the graphics instead, you should uncheck Copy TEXT to clipboard before you copy the records. In a different situation you could paste a record's text information into a drawing application by unchecking Copy BITMAP to clipboard [Copy PICT to Clipboard] before you copy the record.

The clipboard can hold a limited amount of information. When you copy many records, you may run out of clipboard room. You can squeeze more records onto the clipboard when you uncheck one or both of these check boxes. However, this prevents you from pasting text and/or graphics from MapInfo into other applications. When you do not intend to paste information to other applications, uncheck both boxes.

Color Defaults

When you create a thematic map, you need to distinguish between objects in different thematic groupings. When creating a new thematic shading or graph, MapInfo chooses the initial colors and patterns based on this setting. Either a range of solid colors or a range of black and white patterns is used.

Note: Changing the color default settings does not affect existing maps or graphs.

The Monitor setting is the default. This setting uses either colors or fill patterns, depending on the type of monitor you are using. For example, if you have a color monitor, you might want to create a thematic map that uses black and white fill patterns. (Perhaps you are creating a black and white printout.)

The Color setting is useful when you are working on a black and white monitor but want to print on a color printer.

Aspect Ratio Adjustment

The aspect ratio is the relationship between the height and width of the screen. It can be adjusted to deal with various problems. When you are running under Windows, the most common problem is that when you print a map and choose Window Size as your map size, the map is printed out smaller than it appeared on the screen. This problem arises because the Windows interface magnifies sizes when it displays objects; it does this to compensate for the typically large viewing distance and low resolution of the monitor. A map that is six inches by four inches on the screen is typically printed as four inches by two and two-thirds inches.

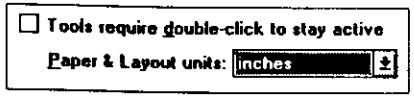
To compensate for this, you can measure the size of your screen and place those numbers in the Aspect Ratio Adjustment box, width first and then height. MapInfo needs the actual size of the display area on the screen. Most monitors do not use the full area of the screen for display. There is generally a border that is not used. You need to measure only the area that is used for display, excluding the border. We find it easiest to hold a piece of paper against the screen and mark the page. Then measure the distance between the marks.

You may also want to use this adjustment simply to fine-tune your display. For instance, when squares do not appear perfectly square, the monitor's aspect ratio may be slightly off. Rather than tinkering with the hardware, you can compensate by measuring the display area and entering the measurements through the System Preferences dialog.

A final and very important situation is when you are using MapInfo in a multi-platform environment—some people working on Windows-based PCs, others using Macintoshes, and others using UNIX workstations. In this case, workspaces created on one platform may not display the same on other platforms. That is because workspaces save window size and position in inches. For example, when you create a workspace on a Windows machine and then display that workspace on a Macintosh, the windows are going to appear smaller. However, when you set the Aspect Ratio Adjustment for each platform, then workspaces display the same on all of them.

When you change the Aspect Ratio Adjustment at some time — you may have gotten a new monitor — all the workspaces created before the change are not displayed in the same sizes. You may want to adjust your old workspaces. Just bring up your workspace, resize and reposition its windows, and then save it again. The new sizes are now saved with the workspace.

Tool Palette



Tools Require Double-Click to Stay Active: When you check this box, you get only one "use" of a tool when you select it with a single click. After you use the tool, the cursor returns to being the Select tool. However, when you double-click a tool when you first select it, you can use it as many times as you want.

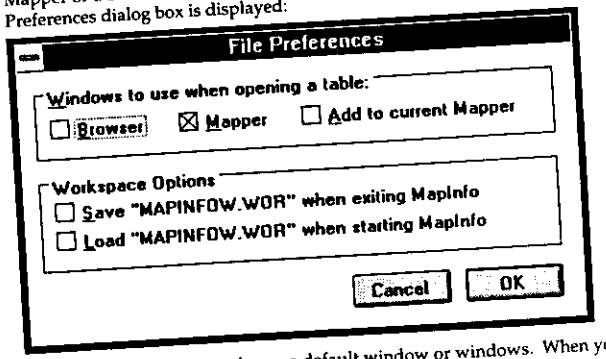
Paper & Layout Units

Paper & Layout units: Use this menu to specify the units MapInfo uses to measure the size of objects in a Layout and the size of paper in any of the Print dialogs. The following units are available:

- inches
- centimeters
- millimeters
- picas
- points

Setting File Preferences

MapInfo has file preference settings that control whether MapInfo automatically opens a Mapper or a Browser when you open a table (File > Open). Click on File and the File Preferences dialog box is displayed:



This dialog allows you to choose a default window or windows. When you open a table, it displays in the type of window(s) chosen; if none are chosen, the table is opened but does not display. Of course, in any particular instance you can use the options in File > Open to override the defaults.

There are three options:

Browser: Choose this option when you want to view the table.

Mapper: Choose this option when you want to map a table.

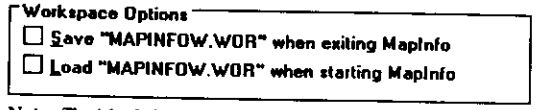
Add to current Mapper: Choose option this when you want to add a table to an already active Mapper.

You can check any combination of these options, or none at all. Your style of work determines which options make most sense for you.

Workspace Options

File Preferences has two checkboxes that govern the "MAPINFOW.WOR" [MapInfo.Workspace] workspace.

Check the first box when you want MapInfo to create this workspace automatically when you exit. Check the second box when you want MapInfo to automatically add this workspace when you start MapInfo.



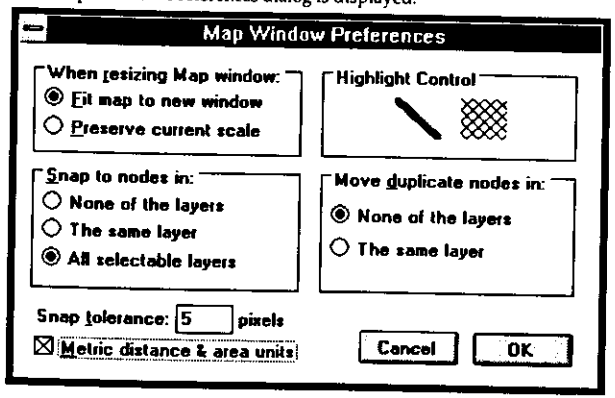
Note: The MapInfo workspace consists of your work setup when you exit MapInfo. See the discussion of workspaces in the User Guide.

Setting Map Preferences

To access the Map Window Preferences dialog:

- Click on Map.

The Map Window Preferences dialog is displayed:



Resizing a Map window

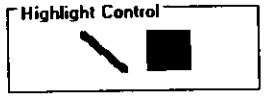
The When resizing Map window option lets you set the default behavior of a Mapper when you resize it. It affects only new map windows. It does not affect Mappers that are already open.

Fit Map To New Window: Choose this option when you generally want to see the same view after you have enlarged or shrunk the Mapper.

Preserve Current Scale: Choose this option when you want the view to change as you change the size of the Mapper. This allows you to see a smaller or a larger area of the map depending on whether you shrink or enlarge the map.

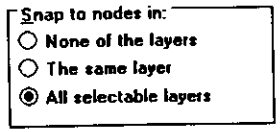
You can override the default by using the Change View dialog which you access either by clicking on the map key (at the bottom-left border of the Mapper) or from the Map menu. This override only works for individual Mappers.

Highlight Control



Use Highlight Control to set the line type (and color) and the fill pattern (and color) for objects that are chosen. To change the chosen line and pattern click on the corresponding symbol to bring up a line/ or Fill Picker. The highlight color and pattern settings only apply to chosen objects in non-editable layers. Chosen objects in editable layers are identified by edit handles

Snap to Nodes



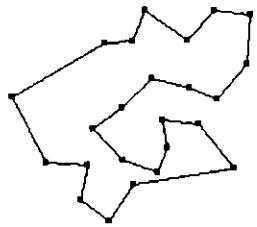
The Snap to nodes in settings operate in conjunction with Snap tolerance. For example, when the tolerance is set at 3 pixels, whenever you move a node within 3 pixels of another, that node gets snapped to the other.

The Snap to nodes in option has three settings:

1. None of the layers
2. The same layer
3. All selectable layers

The three Snap to nodes settings control the behavior of nodes in objects (polygons, lines, or polylines) that you are drawing. Look at the following illustration:

Each of the small squares is a node. MapInfo draws objects in a "connect the dots" fashion. The nodes are the dots.



"Snap to" means that a node you are currently working with is positioned at the same coordinates as some existing node that is within a few pixels of the current node. (You set the number of pixels in the Snap tolerance box, described below.) You use a Snap to node option when you want to be sure a node is positioned in the exact same position as some other node.

When the Snap to node option is set to:

None of the layers: There is no snap-to behavior. Nodes in objects you are currently working on will not match any other nodes.

The same layer: The nodes in an object you are drawing will exactly match nodes that already exist in the same layer if the objects are close enough together.

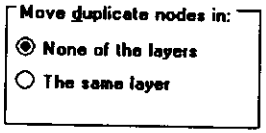
All selectable layers: The nodes in an object you are drawing will exactly match nodes in any layer that is currently selectable.

With either The same layer or All selectable layers chosen, you can exactly trace an already existing line or polygon.

Snap Tolerance

The Snap tolerance field allows you to specify a tolerance within which Snap to nodes operates. The default value is 5 pixels. When you are working in a Mapper containing lots of closely positioned objects, you want a fairly tight Snap tolerance (1, 2, or 3 pixels). When objects are more loosely positioned, you can have a looser tolerance.

Move Duplicate Nodes



In most maps, nodes of various objects are often adjacent to one another; you commonly have streets and boundaries sharing a common border. This dialog allows you to specify whether or not MapInfo looks for duplicate nodes when you are moving a given node (through Reshape).

When the move duplicate nodes option is set to:

None of the layers: MapInfo does not look for duplicate nodes when you are moving some given node.

The same layer: MapInfo moves connected nodes in the same layer when one of them is moved. (For example, if you have adjoining school districts and you adjust one boundary by moving a node, the other boundary (or boundaries) touching that node moves as well.)

Metric Distance & Area Units

When this box is checked, new Mappers display distances in kilometers and area in square kilometers. When unchecked, new Mappers use miles and square miles.

This preference affects only new Mappers. It has no effect on Mappers that are already open. Use Map > Set Map Units to change the units of an existing Mapper.

Previous View

Menu Path

Map > Previous View

Layout > Previous View

Option Enabled If ...

A Mapper or a Layout is the active window.

Purpose

Previous View allows you to return to a map's or layouts immediately preceding view.

Using Previous View

To return to the previous view:

- Choose Previous View from the Map or Layout menu.

MapInfo returns the current Layout or Mapper to the immediately preceding view. By using Previous View repeatedly, you can toggle back and forth between two views of your Mapper or Layout.

If you find yourself doing this often with a particular map, you might want to create two Mappers of the same table, each with a different view. Then you can view the two simultaneously.

Print

Menu Path

File > Print

Option Enabled If...

A Browser, Mapper, Layout, or Grapher is an active window.

Purpose

Print allows you to print the active window using the settings defined in File > Printer Setup.

Using Print

To print, make sure the window you want to print is the active window and choose Print from the File menu. MapInfo displays a dialog that has two sections.

The upper part of the dialog is the Print dialog that is specific to your platform. (For more information on printing, consult your platform-specific MapInfo manual.)

The content of the lower part of the dialog box is specific to MapInfo and depends on the type of the currently active window. Browsers, Mappers, and Graphers have different printing requirements.

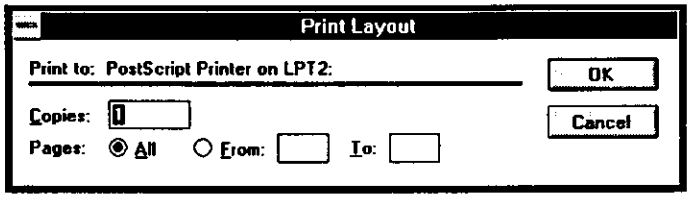
All dialogs for Mapper's, Grapher's, and Browser's have a Set Page Margins button at the bottom. When you click on this button, MapInfo displays a small dialog where you can type values for the top, bottom, left, and right margins. This dialog also tells you the page size you are printing. To set the margins for a Layout, use Layout > Layout Size.

Printing a Layout

To print your Layout:

1. Make sure your Layout is the active window.
2. Choose the Print option from the File menu.

The Print Layout dialog is displayed.



3. Choose the print options you want.
4. Click on OK.

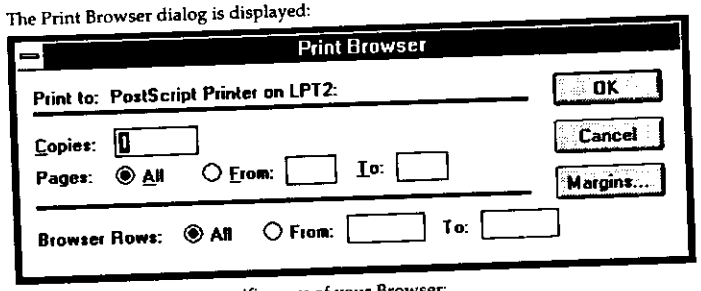
Depending on your printer configuration, your output goes to the printer you specified in the dialog. Consult your system coordinator for your configuration.

Printing the Contents of a Browser

To Print your Browser:

1. Make that Browser the active window.
2. Choose Print.

The Print Browser dialog is displayed:



To print all the rows or specific rows of your Browser:

Browser Rows: Click All to have MapInfo print all the rows in the Browser or click From to print just some of the rows. (Type in the appropriate row numbers) Finally, click OK.

Printing a Map

To print a map:

1. Activate the Mapper containing the map you want to print.
2. Choose Print.

MapInfo displays a dialog where the upper half is a generic MapInfo Print dialog while the lower half is specific to printing MapInfo maps.

3. Choose one of the two Map Contents options: Same as Window or Centered on Window.

A map that is the same as the window has the same content and proportions as the window. A map that is centered on the window may print beyond the extents of the window, depending on how you set its size, scale, and margins. This is how you can print a map that contains areas not visible in the window.

4. Choose one of the three Map Size options: Window Size, Full Page, or a Custom size.

When you choose Window Size, your printed map is the same size as the window on the screen. (Be aware of this when you have a large monitor and can have windows larger than a single page: multiple tiled pages are printed.) This size is displayed in the two text boxes associated with the Custom size option.

When you choose Full Page, MapInfo prints the map to take up the full printed page, even though the window may be much smaller than the page. This size is displayed in the two text boxes associated with the Custom size option.

When you choose Custom, you can set the size you want the map printed. When you want a Custom size, you must type the size into the text boxes associated with the Custom option. Custom size gives the size of the printed image (width and height) in inches. You can specify a size larger than one page, and your map is automatically printed on as many pages as necessary. When you specify a size smaller than one page, the map is centered on the page.

You can also specify a custom scale, allowing you to specify, for example, that one inch on the output page equals 100 miles.

5. Click OK.

When you want to print a map legend, you must place your map and its legend into a Layout. You can then print the Layout.

Printing a Graph

To print a graph:

1. Choose the Grapher containing the graph you want to print.
2. Choose Print.

MapInfo displays a dialog where the upper half is a generic Print dialog while the lower half is specific to printing MapInfo graphs.

3. Choose the size you want the graph to appear on paper:

Window Size: Prints the graph exactly as it is on the screen.

Fit to Page: Prints the graph with the same aspect ratio as the window on the screen (that is, the same proportions of width to height), but enlarges (or shrinks) the graph to fit either the page width or height.

Full Page: Prints the graph to completely fill one page, changing the aspect ratio to fit both the page width and height.

Custom: Allows you to enter you own custom size. When the custom size is larger than one page, MapInfo automatically spreads the graph over the correct number of pages to print the size you request.

4. Click OK.

Radius Search Selector Tool

Menu Path

Tool palette

Tool Enabled If ...

A Mapper is active.

Purpose

The Radius Search Selector tool allows you to graphically select all of the objects within a certain radius.

Using the Radius Search Selector Tool

1. Activate the tool and position the cursor at the center of the area from which you want to select.
2. Keep the mouse button depressed and drag the cursor away from the center point.

As you do so, a dotted circle forms, indicating the area chosen. The exact radius is displayed in the Mapper key at the window's lower-left corner.

3. Release the mouse button when you have the desired radius,.

All of the objects within the radius are chosen.

When you hold down the <SHIFT> key as you choose a radius, the currently selected objects are added to the items selected in the previous select operation.

Remarks

The Radius Search Selector picks objects whose centroid is within the chosen area; the object does *not* have to be completely bounded by the radius.

<SHIFT>-Select works in a special way with the Radius Search Selector. Assume that both LayerA and LayerB of a Mapper are selectable. When you do a <SHIFT>-Select and objects of LayerA are already chosen, then only objects of LayerA within the specified radius or boundary are added to "Selection" as a result (even if objects from other layers are within the appropriate region).

Rectangle Tool

Menu Path

Tool palette

Tool Enabled If ...

A Mapper is active and it is editable.

The Layout window is active.

Purpose

The Rectangle tool allows you o draw rectangles and squares in a Mapper.

Using the Rectangle Tool

First, be sure that the layer you want to work with is editable. When you are sure of that, you can begin drawing your rectangle.

1. Choose the Rectangle tool from the Tool palette.
2. Move the pointer to where you want to begin creating the rectangle.
3. Press and hold down the mouse button and drag the pointer to the opposite corner of the rectangle.

The shape appears on the screen and changes size and proportion as you move the pointer.

4. Release the mouse button to finish creating the shape.

When you want to draw a perfect square, hold the <SHIFT> key down while using the Rectangle tool.

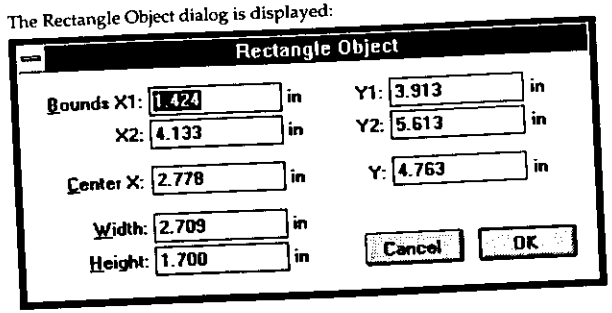
Rectangles are closed figures. They are filled with the default fill pattern and/or color. This is set from the Pick Fill and Pick Line options in the Style menu and with the Line+Fill Picker window. You may, of course, change this whenever you wish.

Attributes of Rectangle Objects

To access the Rectangle Object dialog:

- Use the Select tool and double- click on the object.

The Rectangle Object dialog is displayed:



Specifying Rectangle Object Attributes

Bounds X1 and X2: These are the left and right boundaries, respectively. Y1 and Y2 are the top and bottom boundaries, respectively.

Center X, Y: The coordinate values of the rectangle's center.

Width: Left-to-right distance. You can use the Width box to set the unit of measure in miles, kilometers, meters, or feet.

Height: Top-to-bottom distance. You can use the Height box to set the unit of measure in miles, kilometers, meters, or feet.

Remarks

As with all graphic objects, you can change the object by changing its attributes in the attribute dialog. You might want to do this when you want to be sure of the exact location of the object. You can only change these attributes when the layer is set to be editable. However, you can view the attributes whenever the layer is selectable.

Redraw Window

Menu Path

Window > Redraw Window

Option Enabled If ...

A window is active.

Purpose

Allows you to redraw the active window. This is most useful when you have interrupted the window drawing by pressing the <ESCAPE> key [Command].

When you choose Redraw Window, MapInfo completely redraws the active window.

Rename Table

Menu Path

Table > Rename Table

Option Enabled If ...

At least one table is open.

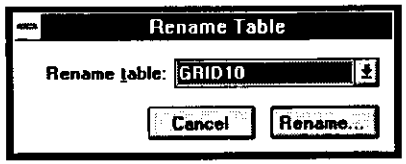
Purpose

Rename table allows you to rename a table and its component files.

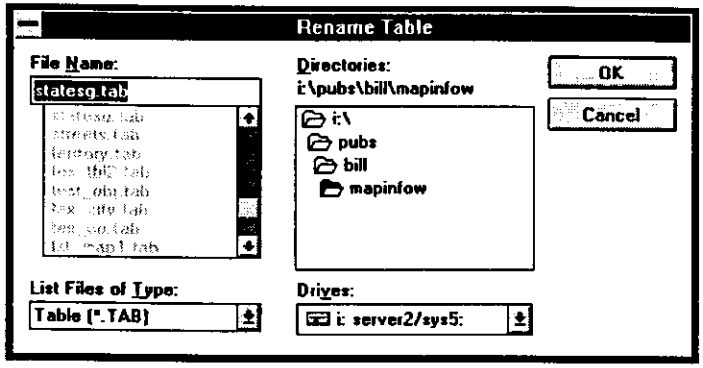
Using Rename Table

When you want to rename a MapInfo table, use MapInfo's Rename Table command rather than going to your file manager (Finder). The reason for this is that a MapInfo table actually consists of several component files. When you rename a table through the file manager (Finder) you have to be sure that you rename all of the component files. When you rename the table using Rename Table, MapInfo automatically renames that table's component files.

When only one table is open, the Rename Table option reads Rename SomeTable, for example: Rename World. When more than one table is open, a dialog displays a menu from which you choose the table:



Once you have chosen a table and clicked OK, the following Rename Table dialog is displayed:



Use this dialog to set the new name—just type it into File Name—and to choose the directory (folder) where you want your renamed table to be.

When you rename a table, any workspaces containing that table are affected. When you want to continue using those workspaces, you should edit the workspace file so that it uses the new table name. You can edit a workspace file in any text editor or word processor.

Reshape

Menu Path

Edit > Reshape

Option Enabled If ...

The Mapper is active, the layer is editable and only one editable object is chosen.

The Layout is active and an appropriate object is selected.

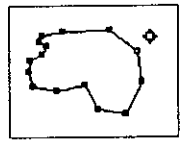
Purpose

The Reshape option allows you to edit polygons, polylines, and arcs by moving, adding, and deleting nodes that define the ends of line segments. This command toggles you into and out of Reshape mode. When in Reshape mode, you can modify nodes one at a time.

Using Reshape

1. Choose the object you want to reshape (using the Select tool from the Tool palette).
2. Choose Reshape to put you in Reshape mode.

Small filled boxes appear at each node in the object. These are reshape edit handles. The cursor becomes a small box in cross-hairs.



Polygon being reshaped.

The hollow node is the active node; it has just been moved. The reshape cursor—upper right—is a square with small crosshairs.

Once MapInfo is in Reshape mode, you can move, add, or delete a node. When you click on a node, it becomes hollow. You can then perform one of the following operations:

Moving a Node

To move a node;

- Click on the node with the cursor and drag the node to its new location.

Deleting a Node

To delete a node:

- Click on the node, and then pick Edit > Clear or press the <DEL> or <backspace> key.

When you delete a node, the next one becomes active. When you want to delete several nodes in a row, just continue to press <DEL> or <backspace>, or press <CONTROL> [Option key] and click on the node to delete.

Adding a Node

To add a node:

- Move the cursor to the point on the segment where you want to add the node and click on that point.

MapInfo adds a node, in effect dividing the segment in two. You can now reposition the new node.

Exiting Reshape Mode

To exit reshape mode:

- Choose the Reshape menu item again

or,

- Click the cursor in an empty area.

Revert

Menu Path

File > Revert

Option Enabled If ...

At least one table has been edited.

Purpose

Revert allows you to revert to a previous version of a table when you have made changes that you do not want to make permanent.

Using Revert

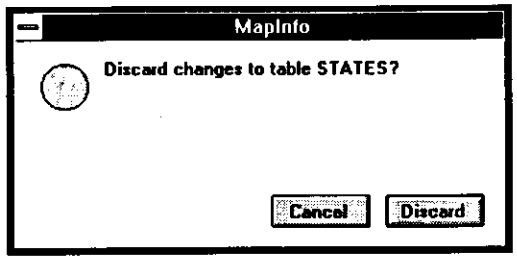
This command replaces selected tables currently in memory with the last versions saved.

1. Choose Revert.

When only one table is active and edited, the Revert command specifies that table. Otherwise, choosing Revert displays a dialog where you can choose the table to revert (that is, return to its previous state).

2. Choose the table you want to revert.

Once you have chosen a table to revert, MapInfo prompts you on whether you wish to discard the changes you have made in the table.



3. Choose Discard in the dialog.

MapInfo discards the changes you have made to the table. However, if you have second thoughts,, you can click Cancel to cancel. You now have a chance to save changes.

Rounded Rectangle Tool

Menu Path

Tool palette

Tool Enabled If ...

An editable Mapper is active.

The Layout window is active.

Purpose

The Rounded Rectangle tool allows you to draw rounded rectangles and squares in a Mapper.

Using the Rounded Rectangle Tool

1. Choose the Rounded Rectangle tool from the Tool palette.
2. Move the pointer to where you want to begin creating the rectangle.
3. Press and hold down the mouse button, dragging the pointer diagonally to the opposite corner of the rectangle.

The shape appears on the screen and changes size and proportion as you move the pointer.

4. Release the mouse button when the rectangle is the size you want.

When you want to draw a square with rounded corners, hold the <SHIFT> key down while using the Rounded Rectangle tool.

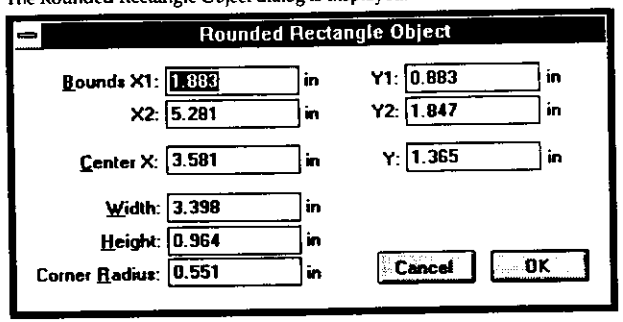
Rounded Rectangles are closed figures. They are filled with the default fill pattern and/or color. This is set from the Pick Fill and Pick Line options in the Style menu and with the Line+Fill Picker window. You may, of course, change this whenever you wish.

Attributes of Rounded Rectangle Objects

To access the Rounded Rectangle Object dialog:

- Use the Select tool and double- click on the object.

The Rounded Rectangle Object dialog is displayed:



Specifying Rounded Rectangle Attributes

Bounds X1 and X2: These are the left and right boundaries, respectively. Y1 and Y2 are the top and bottom boundaries, respectively.

Center X, Y: The coordinate values of the rectangle's center.

Width: Left-to-right distance. You use this menu to set the unit of measure in miles, kilometers, meters, or feet.

Height: Top-to-bottom distance. You use this menu to set the unit of measure in miles, kilometers, meters, or feet.

Corner Radius: Corner radius is measured in units appropriate to the object represented.

Ruler Tool

Menu Path

Tool palette

Tool Enabled If ...

A Mapper is active.

Purpose

The Ruler tool allows you to determine the distance between two points and the length of some path.

Using the Ruler Tool

1. Click at the beginning point of the distance you want to measure.

A Ruler window appears, displaying:

- The distance the ruler is currently measuring
- The total of all the distances measured during the current use of the Ruler tool

As you move the cursor, you will see the distance measurement change in the Ruler window. You can position the Ruler window anywhere on the screen.

2. Click on a second point.

MapInfo adds that distance to the total distance. If you are only measuring the distance between two points, you are done; double-click to terminate the measurement. If you are measuring the length of a path containing more than one segment, continue to step 3.

3. Continue this process to keep a running total of the length of a multi-segment path.

This is useful when you want to follow along a street in a map and see how long the street is. You can also use it to find the distance along a path that includes various streets and roads.

4. Double-click the mouse button when you have completed the measurement.

You can now start another measurement or choose a new tool.

When you choose a new tool, you may want to close the Ruler window. Do so with its Control-menu box [Close box].

When you want to change the units of measure, use the Set Map Units option on the Map menu.

What the Ruler Tool Measures

The Ruler tool measures great-circle distances along the earth. A great circle is a circle whose center is at the center of the earth. A great-circle distance between two points is the distance along the great circle which connects those two points. Great-circle distances are the shortest distance between two points. The Ruler tool measures the shortest distance between two points.

Run

Menu Path

File > Run

Option Enabled If ...

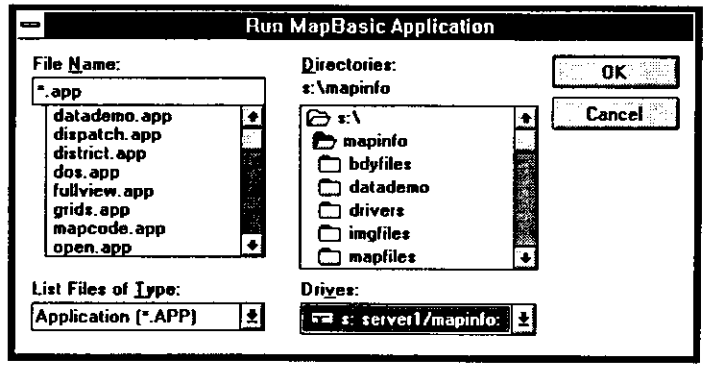
Always.

Purpose

Run allows you to run a MapBasic application.

Using Run

When you choose Run, the Run MapBasic Application dialog is displayed:



Choose an application from the list box, and then click OK. MapInfo then runs the MapBasic application.

Save

Menu Path

File > Save

Option Enabled If ...

At least one table has been edited (i.e., information added, records deleted, table structure modified, etc.).

Purpose

Save allows you to save edits made to a table.

Using the Save Command

When there is only one file with edits pending, the menu option reads, Save Some File. In this case, choose Save and MapInfo saves the changes made to the table.

When there is more than one file with edits pending:

1. Choose Save.

MapInfo displays a dialog. The tables with edits pending are listed in a menu.

2. From this menu, select the table you want to save.
3. Click OK.

MapInfo saves the edits and leaves the table open for continued use.

Remarks

When only one table has edits pending against it, the command includes the name of that table, such as Save states, or Save NY_sale.

See Also

SQL Select

Save Copy As

Menu Path

File > Save Copy As

Option Enabled If...

At least one table is open.

Purpose

Save Copy As allows you to create a new table by saving an existing table under a new name.

Using Save Copy As

Use Save Copy As to create a new table from:

- A table you have edited
- A query table
- A table before you edit it

The original table remains unchanged and open for all further edits.

When you are creating a new table from a table you have edited, the new table contains all the edits made to the original table.

When you are creating a new table from a query table, the new table contains the contents of the query table.

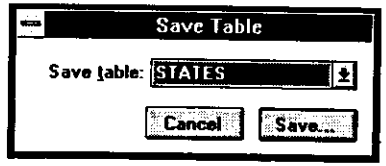
In either case, the new table does not open immediately after it is created, but it can be opened for use at any time.

Saving and Creating a New Table

To use Save Copy As and create a new table:

1. Select Save Copy As from the File menu.

The Save Table dialog is displayed:



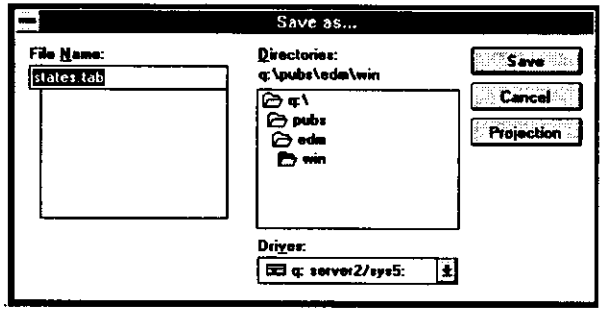
For example, when only one table is open, the command reads, Save Copy of States As . . . In this case MapInfo skips this first dialog.

2. Click on the arrow button next to the Save table box.

A list of all the tables available is displayed.

3. Choose the appropriate table and then click OK.

The Save as dialog is displayed:



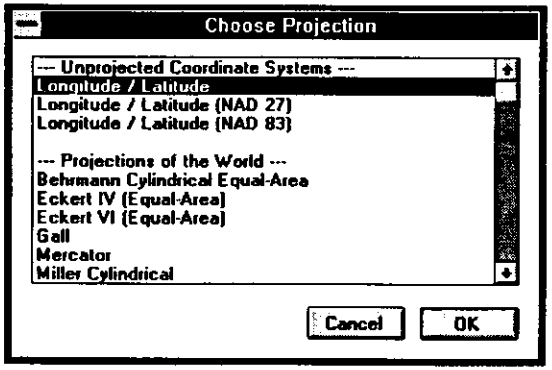
4. Type the name of your new table in the File Name box of the dialog.

At the same time, you can also specify the path [folder] where the new file is to be saved.

When the table you are saving is mappable, the Save Copy As dialog includes a Projection button.

5. Click the Projection button when you want to save your copy as a specific projection.

The Choose Projection dialog is displayed.



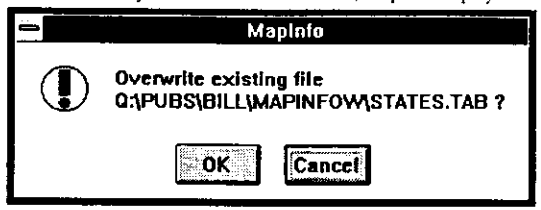
6. Choose the projection you want to use and click OK.

MapInfo returns you to the Save Copy As dialog.

7. Click OK.

MapInfo creates the new table, but it is not open. When you want to work with the new table, you must first open it using File > Open.

If there is already a file with the same name, MapInfo displays the following prompt:



When you click OK, MapInfo proceeds. When you click Cancel, MapInfo returns to the Save Copy As dialog so you can type a new name.

Save Cosmetic Objects

Menu Path

Map > Save Cosmetic Objects

Option Enabled If ...

A Mapper is currently active.

Purpose

Save Cosmetic Objects allows you to save the objects in the Cosmetic layer to a table.

Using Save Cosmetic Objects

Objects get placed in the Cosmetic layer when:

- Labels are drawn
- Objects are drawn or pasted to a Mapper when the Cosmetic layer is the editable layer.

Saving Cosmetic Objects to an Existing Table

To save cosmetic objects to an existing table:

1. Choose Save Cosmetic Objects.

MapInfo displays a dialog that allows you to choose the table to which you want the cosmetic objects transferred. MapInfo displays a list of all open mappable tables, regardless of whether the table is part of the current Mapper. You can save the cosmetic objects to a table that is open, but not in the current Mapper.

2. Choose the table to which you want the cosmetic object saved.
3. Click OK.

MapInfo saves the cosmetic objects to the specified table.

Saving Cosmetic Objects to a New Table

You can save the cosmetic objects to a new table. To do this, simply choose the New option in the dialog.

When you choose the New option, MapInfo displays a dialog where you can:

1. Type the name (and path) of the new table.
2. Click Save.

MapInfo creates the new table and saves the cosmetic objects to it.

Save Workspace As

Menu Path

File > Save Workspace As

Option Enabled If ...

Always,

Purpose

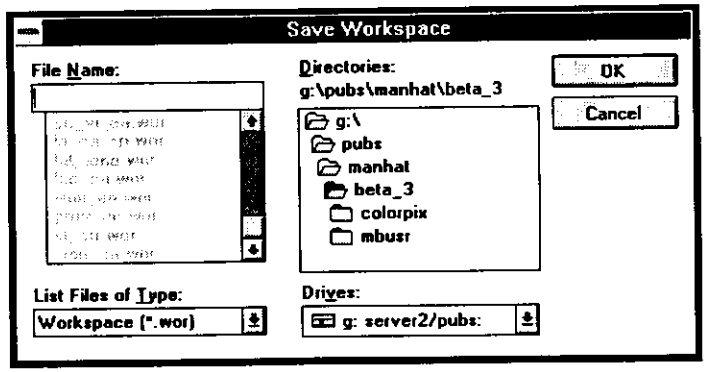
Save Workspace As allows you to save the tables and windows in your current session, so that you can return to this work setup at will. This work setup is called a workspace.

Using Save Workspace As

To save your current setup as a workspace:

1. Choose Save Workspace As.

The Save Workspace dialog is displayed:



2. Type the name of your workspace in the dialog's File Name box.
3. Choose a drive and directory.

When you open a workspace in the course of your session, the name of that workspace is in the dialog's text box. When you leave that name there, MapInfo saves your current setup as that workspace, but not before asking you whether or not you want to replace the currently saved workspace.

4. Click OK.

If you want to change a workspace, simply open the workspace and change it. Then choose Save Workspace As. Leave the name of the current workspace in the dialog and click OK. When MapInfo asks whether or not to replace the existing workspace, choose Replace. MapInfo replaces the old workspace with the current one.

Select

Menu Path

Analyze > Select

Note: The section explains how to use the Select dialog, but it does not discuss how to formulate expressions.

Option Enabled If...

At least one table is open.

Purpose

Select allows you to make a query of your database. It allows you to select records and objects from a table according to attributes of the objects. You can use it to highlight objects in a Mapper or a Browser that meet certain criteria. You can also create a results table that you can then browse, map, or graph like any other table.

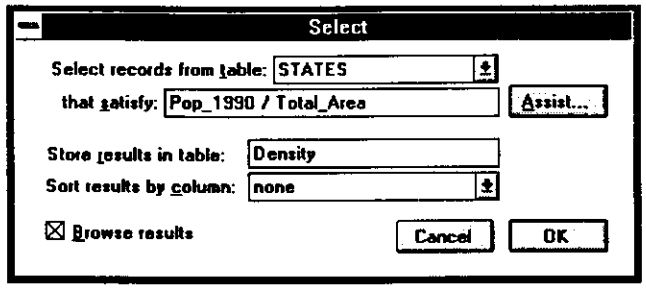
Using Select

When you are working in a Browser, the objects meeting the criteria of the query are highlighted. When you are working in a Mapper, the graphic objects of the chosen records are highlighted using the line and fill patterns set in Highlight Control in Map Preferences. When you are working in both a Mapper and a Browser, the objects in both are highlighted. In all cases, MapInfo automatically creates a working table called Selection that contains the results for the query. You can browse, map, or graph this table like any other table. The table can also be saved as a separate table with Save Copy As.

To access the Select dialog.

- Choose Select from the Analyze menu.

The Select dialog is displayed:



The Select dialog allows you to specify the following search criteria:

Select records from table: Use this menu to choose the table you want to work with.

That satisfy: Type your query here.

Store results in table (optional): This option allows you to name the temporary table that holds the query results. "Selection" is the default value. If you choose "Selection," MapInfo names the table Query1, Query2, etc., if you should later decide to Browse results or if the Browse Results box is checked.

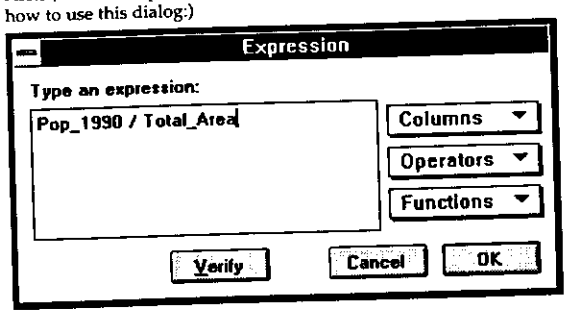
Sort results by column (optional): Use this menu to choose a column on which to have the query sorted. By default, the query is unsorted. When you want the query sorted by the value in some column, choose that here.

You can sort a table into some desired order by using Select and specifying a sort, but not using any expression. MapInfo then selects all records in the table and sorts them according to their values in the specified column.

Browse results: This box is checked by default. When you want a Browser of your query results, leave it checked. Otherwise, uncheck it. The Browser is named according to the specifications entered into Store results in table.

OK: Executes the query.

When you need help or if you need a larger space in which to type your query, click on Assist, and the Expression dialog is displayed. (See the Expression entry for a description of how to use this dialog:)



See Also

SQL Select

Select All

Menu Path

Analyze > Select All

Option Enabled If ...

The Browser is active.

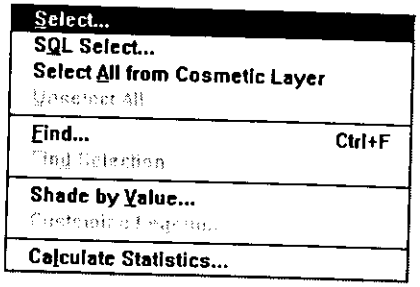
The Mapper is active, and at least one layer is selectable.

The Layout is active.

Purpose

Select All allows you to select all objects from the top-most selectable layer in a table or window.

Using the Select All Command



- Choose Select All from the Analyze menu.

The name of the top-most selectable layer appears after the Select All command (e.g., Select All "from Cosmetic Layer".

When a Browser is active, MapInfo selects all the records in the table. When a Mapper is active, MapInfo selects all the objects in the currently editable layer. When a Layout is active, MapInfo selects all objects in the Layout. When the Command window is active, it selects all the text in the window.

Select Tool

Tool enabled if ...

The Select tool is always enabled.

Purpose

Use the Select tool to select one or more objects or records for analysis or editing.

Note: Making selections is one of the basic MapInfo operations, and using the Select tool is only one way of making selections.

Using the Select Tool in a Mapper or Layout

The Select tool works with objects in Mappers and Layouts and records in a Browser. The tool must be active before you can use it. Activate the tool by clicking on it. The tool's icon is highlighted in the Tool palette and the cursor becomes a pointer.

Selecting Objects

To select a single object:

- Click on it.

When the layer is selectable, it is shaded or hatched according to the settings you specified in the Preferences option in the Edit menu. When the layer is editable, it has edit handles and is colored and patterned as it was originally defined. When you select another object, the first object is unselected.

To select a number of objects all within a more or less rectangular boundary:

- Drag the Select tool over them from one corner of the rectangular area to the other.

MapInfo places a dotted rectangular border, called the marquee, on the screen. All of the objects within the rectangle are chosen.

There is a restriction that applies when selecting in a Mapper. You can only select from one table at a time.

To add an object or objects to the current selection:

- Hold the <SHIFT> key down and make another selection.

Do this operation as often as you want. Each time you do it, the newly chosen object or objects are added to the current selection set.

Deselecting Objects and Removing Objects from the Selection

To deselect an object or remove it from the selection set:

- Hold the <SHIFT> key down and then click on the object.

When you click, the object is removed from the selection set.

To deselect all objects:

- Choose Unselect All from the Analyze menu

or,

- Click someplace on the Mapper where there are no objects.

"Hot Spot" for Point Objects

When selecting a point object, position the Select tool in the center of the symbol. However, some symbols have a "hot spot" that you must hit. For the small flag on a pole (like those used to mark the hole on a golf course), the hot spot is at the base of the pole. In the case of arrows, the hot spot is the point.

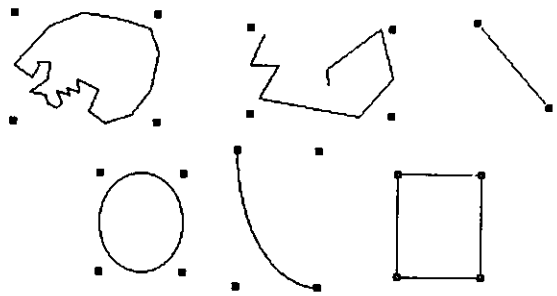
<CONTROL> [Option] Select

When you press and hold the <CONTROL> [Option] key while using the Select tool, it selects the next selectable object beneath the current object. When you have several objects overlapped in the same layer, it selects the next object down. When there are no more objects left in the current layer, MapInfo starts selecting objects from the next selectable layer down.

For example, imagine you have three objects overlapped in the same place in a layer. Let us call them Three, Two, and One (moving from the top down). MapInfo selects Three if you have not pressed <CONTROL>. If you press <CONTROL>, MapInfo selects Two on the first mouse click and One on the second click. When this is the only selectable layer, MapInfo cycles back to the beginning (Three) on the third click. When, however, there is another selectable layer, MapInfo moves to that layer on the third click.

Selecting Objects in an Editable Layer or Layout

When you choose an object (or objects) in an editable layer or Layout, you can resize it, reshape it, move it, or change its attributes. When you select an object, edit handles are displayed. Edit handles are small filled squares at the corner of an object's bounding rectangle.



Edit Handles for Various Graphic Objects

Resizing an Object

- Place the cursor on one of the edit handles, click, and drag the cursor until the object has the appropriate size.

When you want the object to maintain its original proportions while you resize it, hold down the <SHIFT> key while you resize it. This also works when you're resizing multiple objects at once. The <Shift> key can be pressed or released while you're dragging -- you don't have to hold it down before you begin.

You cannot resize text or symbols this way. To resize them you have to change their point size. You do this by double-clicking on the text or symbol to bring up the attributes box and make the change there. You can also make the changes through the Font Picker or Symbol Picker.

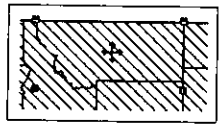
Reshaping an Object

- Choose Edit > Reshape.

You can only reshape polylines, polygons, and arcs. For more information, see the entry for Reshape.

Moving a Single Object

- Hold the mouse button down until the cursor changes to arrows (see illustration). Keeping the mouse button down, drag the object to its new location and release the button.



The "move" cursor

You can move several objects at a time. Once you have chosen multiple objects—using any MapInfo selection technique—place the cursor on any one of them and act as if you were selecting a single object. When you move the objects, all of them move at once, maintaining their positions relative to one another.

Changing Drawing Attributes

- Double-click on the object and edit its attributes in the dialog box.

This allows you to enter exact coordinates and dimensions for the object. For more information, see the entries for the various drawing tools: Arc, Ellipse, Line, Polygon, Polyline, Rectangle, Rounded Rectangle, Text, and Frame.

Using the Select Tool in a Browser

Selecting a Row

To select a row in a Browser:

- Click on a row in the table.

The row is selected.

Adding a Row to the Current Selection

To add a row to a current Browser selection:

- Hold the <SHIFT> key down and select another row.

That record is added to the current selection. You can do this operation as often as you want.

Removing a Row from the Current Selection

To remove a row from the current Browser selection:

- Shift-click on an already chosen row.

The row is removed.

Displaying an Info Window

To display an Info Window about a row:

- Double-click on the row.

This is useful if you want to compare the contents of two widely separated rows. Double-click on one row and then move through the Browser to the other row. You can see the contents of the first row in the Info window and the second row in the Browser itself.

Send to Back

Menu Path

Layout > Send to Back

Option Enabled If ...

A Layout is the active window and an object in the Layout is chosen.

Purpose

Send to Back allows you to move an object behind an object or objects it is obscuring.

Using Send to Back

All objects in a Layout are ordered from front to back in the Layout. Think of the frames and other graphic objects as being stacked in the Layout. When you draw a new object it is automatically the frontmost object. The object overlaps any other object in the Layout. You use the Send to Back and Bring to Front commands to change the ordering of objects. Once an object is selected, the commands are performed from the Layout menu.

When you choose Send to Back, MapInfo moves the currently chosen object or objects behind all other objects. You can use Send to Back in conjunction with Bring to Front to re-order overlapping objects. You can move any number of objects simultaneously. The selected objects maintain their relative front-to-back ordering, and are placed behind all other objects. For example, you have added a dropped shadow to an object, you should select both the object and its dropped shadow when you want to send the object to the back. Otherwise, the object goes behind its dropped shadow.

Note: When the object you want to select is behind other objects, you can press <CONTROL> [<Command >] while using the Select tool. This causes the Select tool to cycle through overlapping objects, starting with the topmost one.

Series

Menu Path

Graph > Series

Option Enabled If ...

You are working with a Grapher.

Purpose

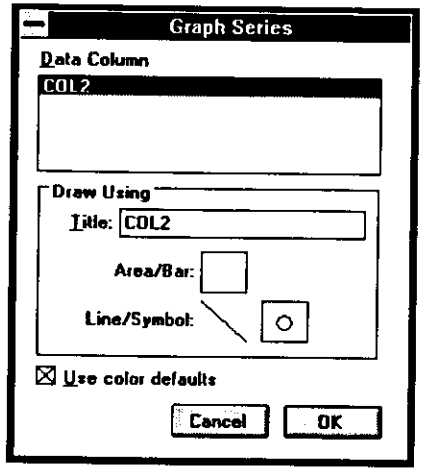
Series allows you to customize the appearance of data elements in a Grapher.

Using Series

To access the Graph Series dialog.

- Choose Series from the Graph menu.

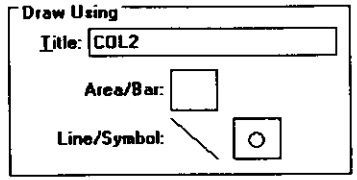
The Graph Series dialog is displayed:



The Graph Series dialog allows you to specify the name of the series and the color and pattern of series elements. There is one dialog for bar charts, and line, area, and X-Y graphs and a different one for pie charts.

Specifying Graph Characteristics

- Data Column: This box lists the columns in the current graph. Choose the one you want to customize.



Title: When you want some title other than the column name, you can type it here.

Area/Bar: Displays the color, fill pattern, and border line style used for bars (on bar charts), and areas (on area graphs). For bars and areas, simply click on the fill rectangle, and MapInfo displays the Pick Line+Fill dialog. From which you can choose the color, fill pattern, and border line style (See the entry Pick Fill.)

Line: The line setting is used to draw the lines a line graph, and to draw the drop lines for a line graph, an XY graph, and an area graph. When you click on the line, MapInfo displays the Pick Line+Fill dialog, where you can set your line style.

Symbol: Use this to set the symbol style used to represent data points in line and XY graphs. When you click on the symbol rectangle, MapInfo displays the Pick Symbol dialog for you to use.

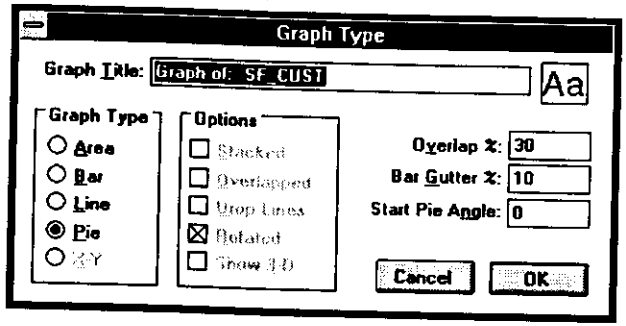
Use color defaults: When this is checked (its default setting), MapInfo selects default values for colors. When it is not checked, MapInfo uses black and white patterns as defaults. The customizing choices you make in this dialog override these defaults.

Using Series for Pie Charts

There is a different Graph Values dialog for pie charts that lets you specify the color of each wedge in the chart.

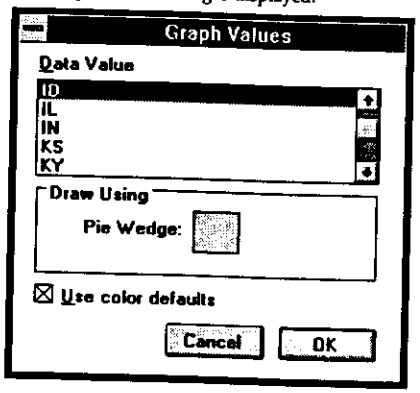
1. Choose Graph Type from the Graph menu.

The Graph Type dialog is displayed:



2. Choose Pie from the Graph Type box.

The Graph Values dialog is displayed:



Specifying Pie Chart Attributes

Data Value: Select the data value of the wedge you want to customize.

Draw Using: Click on the rectangle to get the Pick Line+Fill dialog. Use that dialog to choose the color and fill and the line style for the wedge.

Use color defaults: When this is checked, MapInfo uses color defaults in creating pie charts. When you uncheck it, MapInfo uses black and white defaults. The customizing choices you make in this dialog override these defaults. However, if you have created a custom scheme for a pie chart and want to return to the defaults, click on this box twice. The defaults are restored when you leave the dialog.

Regardless of which dialog box you are using, when you are done, click OK to exit. The graph redraws with the new Series settings.

Set Map Units

Menu Path

Map > Set Map Units

Option Enabled If ...

A Mapper is the active window.

Purpose

Allows you to specify units of measure in a Mapper.

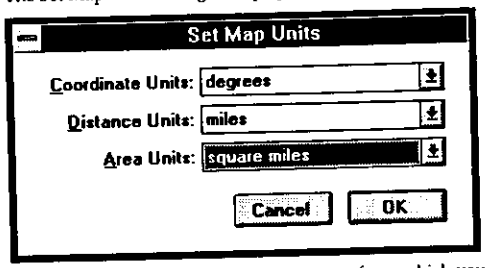
Using Set Map Units

Use the Set Map Units option to display a dialog that allows you to set map units for individual Mappers.

To access the Set Map Units dialog:

- Choose Set Map Units from the Map menu.

The Set Map Units dialog is displayed:



The Set Map Units dialog has three menus from which you choose Coordinate Units, Distance Units, and Area Units.

Coordinate Units

Earth Maps	Non-Earth Maps
The menu always contains degrees. It may also contain the native units for the coordinate system if they are not degrees.	inches feet yards miles millimeters centimeters meters kilometers

Distance Units

Earth Maps	Non-Earth Maps
feet	inches
US Survey feet*	feet
yards	yards
miles	miles
nautical miles**	millimeters
meters	centimeters
kilometers	meters
	kilometers

*One US Survey Foot is equal to 12/39.37 meters or approximately 30.48006 centimeters.

**A nautical mile equals 1852 meters.

Area Units

Earth Maps	Non-Earth Maps
square feet	square inches
square yards	square feet
acres	square yards
square miles	acres
square meters	square miles
dectares	square millimeters
square kilometers	square centimeters
	square meters
	hectares
	square kilometers

Shade by Value

Menu Path

Analyze > Shade by Value

Option Enabled If ...

A Mapper is active.

Purpose

Shade By Value allows you to use objects, (points, lines, and regions) to represent data values associated with those objects.

About This Entry

For more information on Shade by Value, see Appendix 7.

Show/Hide Grid

Menu Path

Browse > Show/Hide Grid

Option Enabled If ...

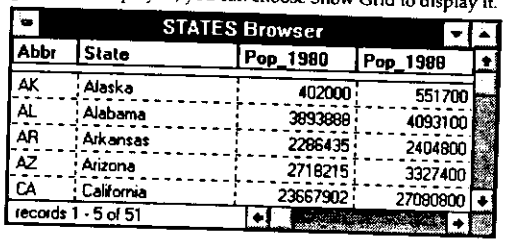
A Browser is active.

Purpose

Show/Hide Grid allows you to display or hide the grid pattern in the Browser.

Using Show/Hide Grid

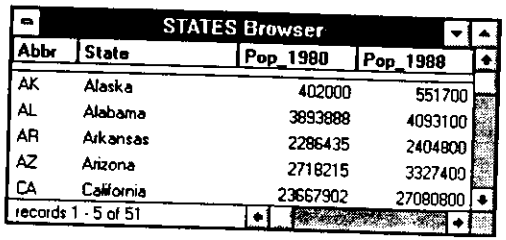
When the grid is displayed, you can choose Hide Grid to make the grid disappear. When the grid is not displayed, you can choose Show Grid to display it.



STATES Browser

Abbr	State	Pop_1980	Pop_1988
AK	Alaska	402000	551700
AL	Alabama	3893888	4093100
AR	Arkansas	2286435	2404800
AZ	Arizona	2718215	3327400
CA	California	23667902	27080800

records 1 - 5 of 51



STATES Browser

Abbr	State	Pop_1980	Pop_1988
AK	Alaska	402000	551700
AL	Alabama	3893888	4093100
AR	Arkansas	2286435	2404800
AZ	Arizona	2718215	3327400
CA	California	23667902	27080800

records 1 - 5 of 51

Show/Hide Legend

Menu Path

Window > Show/Hide Legend

Option Enabled If ...

Always. When there is a legend on the screen, the option reads Hide Legend. When there is no legend on the screen, it reads Show Legend.

Purpose

Show/Hide Legend allows you to display or hide the legends associated with both Mappers and Graphers.

For a thematically shaded Mapper, the legend is a summary presentation of its thematic shading. When you have one or more layers shaded by value (thematically mapped), you can choose to display a legend identifying the ranges and their colors/symbols. When your Mapper is not shaded, the legend displays the map scale.

For a Grapher, the legend indicates what each data series represents.

Show Legend displays the legend window. You can close the legend by clicking on its Control-menu box [Close box].

Show/Hide Line+Fill Picker

Menu Path

Style > Show/Hide Line+Fill Picker

Option Enabled If ...

Always.

Purpose

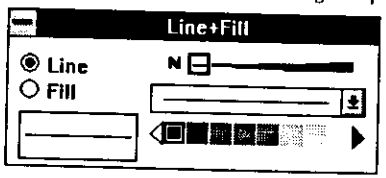
The Show/Hide Line+Fill Picker allows you to display or to hide the Line+Fill Picker.

Using Show/Hide Line+Fill Picker

To access the Show/Hide Line+Fill Picker dialog:

- Choose Show/Hide Line+Fill Picker from the Style menu.

The Show/Hide Line+Fill Picker dialog is displayed:



When the Line+Fill Picker is not displayed, the command reads Show Line+Fill Picker. When the Line+Fill Picker is displayed, the command reads Hide Line+Fill Picker. The Line+Fill Picker can also be hidden by clicking on the Control-menu box (Close box).

Using the Line+Fill Picker, you can change fill colors and patterns in existing objects or you can set a color and pattern to appear in every fillable object you create. A sample of the pen and brush settings appears in the box at the lower left of the dialog and its outline is shown in the dialog box. Click on the Line button to access the Line palette; click on the Fill button to access the Fill palette.

Show/Hide MapBasic Window

Menu Path

Window > Show/Hide MapBasic Window

Option Enabled If ...

Always.

Purpose

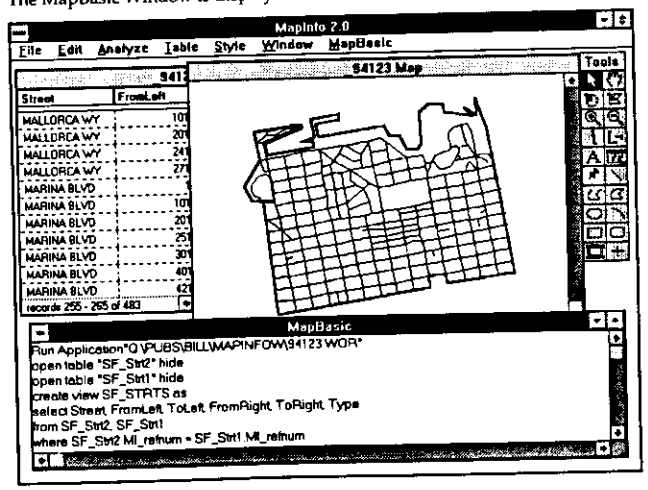
Show/Hide MapBasic Window allows you to display or hide the MapBasic window.

Using Show/Hide MapBasic Window

To access the MapBasic Window:

- Choose Show MapBasic Window from the Window menu.

The MapBasic Window is displayed:



You can use the MapBasic window for two tasks:

- Issuing commands to MapInfo.
- Debugging MapBasic programs. (This task is described in the MapBasic documentation.)

You can perform many different tasks by typing statements into the MapBasic window. Those same tasks could instead be performed by choosing items from MapInfo's menus. There are times, however, when it is easier to type commands into the command window.

Issuing Commands Through the MapBasic Window

When you issue a command through the MapBasic window, you must use the correct syntax. When you choose many of MapInfo's menu options, MapInfo displays the commands in the MapBasic window. You can learn something about the syntax of MapInfo commands simply by observing them in the window.

To issue a command through the MapBasic window:

1. Type the command.

When you have finished typing the command

2. Press <Enter>.

MapInfo executes the command.

When the command does not have the result you want, you can edit the command statement by deleting items, adding new items, or rearranging items.

To reissue a command that you have previously issued:

1. Position the cursor anywhere within the command statement.
2. Press <Enter>.

This is particularly useful when you want to issue a command several times with small changes each time (as in the Create Point example below).

To reissue a series of commands:

1. Choose the series by dragging the cursor over them to highlight them.
2. Press <ENTER>.

MapBasic Window Examples

Here are some examples of things that you can do through the MapBasic window.

Browsing a derived column

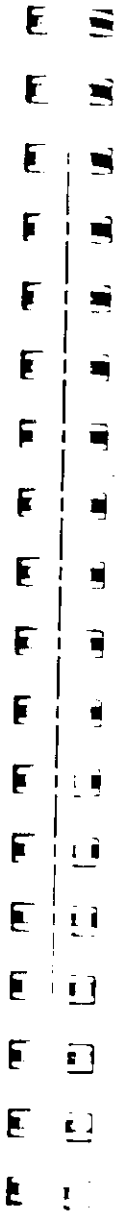
Assume that you want to browse the results of a calculation made with some of your data values, but you do not want to issue a SQL Select statement to do so. You can issue a Browse command instead. For example, you might want to see the population density for Oklahoma counties. Assuming that the OKCOUNTY table has columns called COUNTY and POP_1990, the following statement would produce a Browser with a derived column containing population density.

```
Browse COUNTY, Pop_1990/Area(obj, "sq mi") From OKCOUNTY
```

Creating an Objects Menu on the Menu Bar

When you do a lot of editing you may find yourself constantly going to the Objects submenu. You could get to those options more easily if the Objects menu was directly on the menu bar. You can place the Objects menu directly on the menu bar by issuing this command from the MapBasic window:

```
Alter Menu Bar Add "Objects"
```

Creating Objects with Specific Coordinates and Dimensions

Assume that you have a table, called Towers, that gives the location and broadcast area of radio transmitters. The location is stored in two columns, Xcoord and Ycoord, and the broadcast area is given in a column called Radius. You want to create a circle around each tower that has its radius equal to the radius of the broadcast area.

You can do this by issuing the following statements from the MapBasic window:

```
Open Table "towers.tab"
Update towers Set obj = CreateCircle(xcoord,ycoord,radius)
```

The first line opens the table. In the second line, the Update command creates the circles. It uses the Create Circle function to access the values of Xcoord, Ycoord, and Radius and use those values to create the proper circles.

For example, you have a table of data about point objects—cities, crime sites, telephone poles, etc. You want to create point objects for this table and you know the coordinates for these points. You can issue a Create Point command that does the job:

```
Create Point ( -73.4567,  42.5678 )
```

To create the next point, don't retype the whole line, just type over the x,y coordinates.

Move to a Specific Row In a Browser

Maybe you have a Browser with thousands of rows, and for some reason you want to go to row # 855. There's no way to do this through a menu option. Through the MapBasic window:

```
Set Browse  Row  855
```

Creating a Complex Expression for Select, SQL Select, or Update Column

When you want to use a particularly complex expression in a Select, SQL Select, or Update Columns, it may be more convenient to type the command in the MapBasic window. There MapBasic window has more space for you to examine the whole expression and to make changes.

Note that the MapBasic Select command gives you the functionality of both the Select and SQL Select menu options.

Show/Hide Statistics

Menu Path

Window > Show/Hide Statistics

Option Enabled If ...

Records/objects are selected in some table.

Purpose

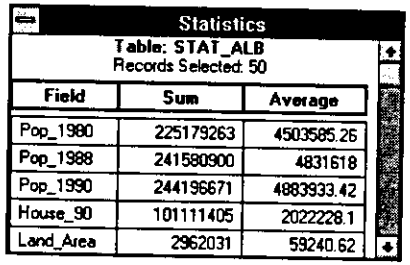
Show/Hide Statistics allows you to show or hide the Statistics window.

Using Show/Hide Statistics

To access the Statistics dialog:

- Choose Show Statistics from the Window menu.

The Statistics dialog is displayed:



The Statistics window is a floating window that tallies the sum and average of all numeric fields for the currently chosen objects/records. The number of records chosen is also displayed. As the selection changes, the data is re-tallied, and the floating window is updated automatically.

When you want statistics for an entire table, use Analyze > Select All to select all records in a table.

Show/Hide Symbol Picker

Menu Path

Style > Show/Hide Symbol Picker

Option Enabled If ...

Always

Purpose

Allows you to show or hide the Symbol Picker.

Using Show/Hide Symbol Picker

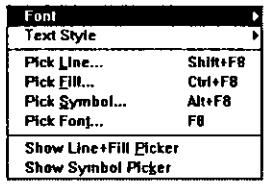
To access the Symbol dialog:

- Choose Show Symbol Picker from the Style menu.

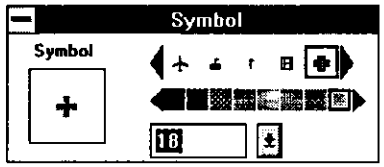
When the Symbol Picker is not displayed, the command reads Show Symbol Picker (see below).

When the Symbol Picker is displayed, the command reads Hide Symbol Picker.

The Symbol Picker can also be hidden by clicking on its Control-menu box [Close box].



The Symbol dialog is displayed:



To choose a symbol:

1. Choose a symbol from the Symbol palette. The symbol you have chosen is surrounded by a square and displays in the symbol box at the right.
2. Choose a color from the color palette.
3. Choose a point size from the menu. Use the "Other" option if you want a size other than those displayed on the menu.

Show/Hide Tool Palette

Menu Path

Window > Show/Hide Tool palette

Option Enabled If ...

Always.

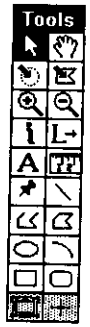
Purpose

Show/Hide Tool Palette allows you to show or hide the Tool palette.

Using Show/Hide Tool Palette

When the Tool palette is not displayed, the command reads Show Tool Palette.

When the Tool palette is displayed, the command reads Hide Tool Palette.



The table below shows what tools are usable in Mappers, Browsers, and Layouts. Tools cannot be used with Graphers.

Tool	Browser	Selectable Mapper	Editable Mapper	Layout
Select	X	X	X	X
Grabber		X	X	X
Radius Search		X	X	
Polygon Search		X	X	
Zoom-in		X	X	X
Zoom-out		X	X	X
Info	X	X	X	
Label		X	X	
Text	X		X	X
Ruler		X	X	
Symbol			X	X
Line			X	X
Polyline			X	X
Polygon			X	X
Ellipse			X	X
Arc			X	X
Rectangle			X	X
Rounded Rectangle			X	X
Frame				X
MapBasic Tool*				

*The use of the MapBasic Tool is determined by the application developer. There is no general rule for its use.

Smooth

Menu Path

Edit > Smooth

Option Enabled If...

A Mapper is active, a layer is editable, and a polyline is chosen.

While Smooth is available when any object is chosen, it only smooths a polyline. It does not smooth a polygon or a rectangle.

Purpose

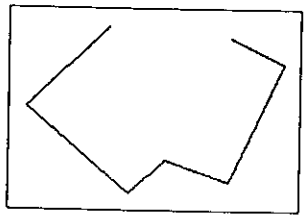
Allows you to smooth a polyline, making it into a continuous curve.

Using Smooth

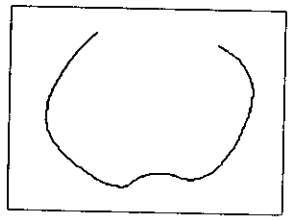
To smooth a polyline:

- Select a polyline in an editable layer.
- Choose smooth from the Edit menu.

The polyline is smoothed.



Polyline



Polyline that has been smoothed

SQL Select

Menu Path

Analyze > SQL Select

Option Enabled I f...

At least one table is open.

Purpose

SQL Select allows you to generate query tables using one or more base tables and using derived columns.

About This Entry

SQL Select is one of the most powerful commands in MapInfo. This entry has several sections, as follows:

Overview: Using SQL Select	page 257
SQL Select Dialog	page 258
Aggregate Functions	page 262
Geographic Operators	page 264
Subselects	page 266
Update Column & SQL Select Query Table	page 268

Overview: Using SQL Select

SQL Select returns a table of records that meet the criteria specified in the dialog. In this process, it combines data from several different tables, aggregates data, and sorts the records. Three concepts are helpful in understanding what happens as you use SQL Select:

- Derived information
- Joining tables
- Assembly

Derived Information

Derived information is information that can be calculated from information in a table but that is not directly present in the table. For example, the states table that comes with MapInfo has a column for 1990 population (POP_1990) and another column for the total area (TOTAL_AREA) of the state. That information is explicit. When you divide the 1990 population by the total area, you get the 1990 population density. Population density is derived. You cannot read density values in the table, but you can calculate them from explicit information.

Continuing with the example of states table, we can derive information about population change from information that is explicit in the table, which contains information about 1980 population (POP_1980) and 1988 population (POP_1988). If you are interested in population change between 1990 and 1980, you could subtract 1980 population from 1990 population. This would give you the absolute difference in population. Alternatively, you could divide 1990 population by 1980 population, that would give you the ratio between the population

values. Whichever way you go, your information about population change is derived information.

SQL Select lets you take one or more tables and create a new table containing derived information. This derived information is based on information that is explicit in your source tables. The type of derived information you create is limited only by your imagination.

Joining

Typically, you store your information in several different databases. You have your own datafiles, and you may also have various databases of statistical information that you have purchased from MapInfo. SQL Select allows you to create relational joins so that you can bring information from these various databases together in your mapping.

Imagine that you have a table of counties that has demographic information--the population of people in various age ranges, ethnic groups, and occupational categories in each county. You also have a database containing information about customer orders. You want to examine these two tables and see if certain kinds of orders come from counties having certain demographic characteristics. Perhaps you want to select counties according to combinations of orders and demographic characteristics.

To do this you have to be able to join the two tables. One way to join two tables is to use a column that contains matching information. The counties table contains the name of the county. Similarly, one of the columns in the order table contains the name of the county in which the order originated. These two tables have one field in common, the county name. MapInfo uses that common field to match information in the customer table to the objects in the geographic table.

County	Pop_1980	Pop_1990
Foster	23,789	27,135
Williamette	35,456	34,846
Mason	147,101	151,201

County Table

Order #	Customer	County
478001	Francis	Foster
478002	James	Foster
478003	Wickwire	Mason

Order Table

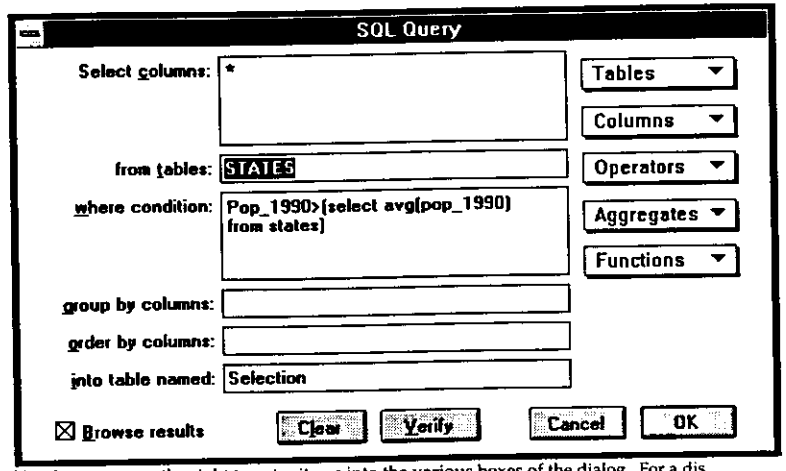
When you use SQL Select, you tell MapInfo to match the information in the County column of the counties table with the County column of the orders table. Given that clue, MapInfo is able to link other information about orders to information about county demographics.

You can also specify joins geographically. When the two tables have graphic objects, MapInfo can match records on the basis of the spatial relationship between those objects. For example, you could match cities and counties such that records for cities are joined to those of the counties containing them.

Assembly

The concept of assembly is simple: You create a new table by assembling explicit or derived information from one or more existing tables. The point is that you can use SQL Select to assemble existing information into substantially new databases. You can use MapInfo's Select command to create one table that is a subset of another table. You can use SQL Select to create a table that is quite different from any of its source tables.

SQL Select Dialog



Use the menus to the right to enter items into the various boxes of the dialog. For a discussion and examples of MapInfo's operators and functions, see Appendix 7, Creating Expressions.

Select Columns

In the first box, the Select columns box, you list the columns (i.e., fields) you want to appear in your query table. If you want to use all of the columns, leave the asterisk in the select box—or place one there if it is not already there. When you type column names into the box, be sure they are separated by commas.

The Columns menu is empty until you fill in the From tables box.

You can have two kinds of columns in the list:

- Columns that are from one of the base tables you are using
- Derived columns, that is, columns that are based on expressions

When you are using more than one table, a column name should be preceded by the name of its table, with the two separated by a period. "STATES.ABBR" refers to the ABBR column in the states table, and "STATES.POP_1990" refers to the POP_1990 column in the states table. When you choose your columns from the menu, MapInfo automatically attaches the table name to the column name.

Derived columns are defined by expressions, such as:

- `sum(ORDER_AMOUNT)`
- `POP_1990/POP_1980`
- `avg(RECEIVED-SHIPPED)`

MapInfo evaluates the expression and places the result in the derived column. The name of the column is the expression itself.* This can be awkward.

However, you can use specify an alias for any column named in Select Columns. An alias is simply an alternative name for a column. When you specify an alias, the alias appears as the column name in the results table. To specify an alias:

1. Type a blank space after the column name.
2. Type the alias enclosed in double quotes.

For example, you might specify aliases for the derived columns in the example as follows:

- `sum(ORDER_AMOUNT) "Total_Amount"`
- `POP_1990/POP_1980 "Population_Change"`
- `avg(RECEIVED-SHIPPED) "Avg_Processing"`

When you place "object" (or "obj") into a column, MapInfo lists the type of object attached to that row (line, polyline, polygon, etc.).

Finally, you cannot have an asterisk followed by column names. You might be tempted to do this when you are working from several tables. You might want all the columns from one table, and only one or two columns from another table (or tables). However, in that case you must list all of the columns. There is no way you can use the asterisk to designate all columns from only one of the tables.

From Tables

List the tables you want to use for your selection. When you are doing a multi-table join, the tables must be base tables. You cannot use query tables in multi-table SQL Selects.

Where Condition

The Where condition specifies what records (rows) from the base table, or tables, are included in the query table. This is comparable to the That Satisfy line in a query using the Select command. The condition is formulated in the standard way, using variables (columns) and relations between variables (operators). Any of the examples listed above could be used here.

You can use any column in your base table (or tables), whether or not it is listed in the Select Columns box. Columns can be referred to by name or by number, where the number designates the order the column has in Select Columns. "col1", "col2", and "col6" indicate the first, second, and sixth columns respectively. The number must be preceded by the letters "col".

You must have a Where condition when you're selecting from more than one table. In this situation, the condition tells MapInfo how to join the two tables. The Where condition can be as simple as asserting that the values in one field of one table equal the values of one field in the other table: TABLE_A.SERIAL_NUM = TABLE_B.PART_NUM. Notice that, because we're dealing with a multi-table query, the column name is preceded by the table name.

* Note that sum() and avg() are aggregate functions, which are discussed on page 262 below. You can also use ordinary functions—such as Abs, or Round—in expressions for derived columns.

When specifying a Where condition in a multi-table query, you have to be careful about the order in which you enter your column names. For example:

from tables	**TAB_A, TAB_B, TAB_C**
Where condition	**TAB_A.NAME=TAB_B.NAME and TAB_B.NAME=TAB_C.STATE**

The columns in the expressions in the Where condition are entered in the same order as their parent tables are listed in from tables.

Further, if you are working with multiple tables, the clauses where you specify how to join the tables must come before any other clauses in the Where condition.

Finally, you can use a Select statement in a Where condition. This is called a subquery (See page 266).

Note: You cannot use aggregate functions in a Where condition.

Group by Columns

Group by columns groups rows in the query table so that all rows with the same values for the specified columns are grouped together. When used in conjunction with aggregate functions (count, sum, avg, min, max), rows with the same value on all grouping columns are treated as a group, duplicate rows are suppressed, and aggregate values are reported for derived columns based on aggregate functions.

All columns in the Select box that are not based on aggregate functions must be listed in Group by columns. These are the columns MapInfo examines to determine the groupings. Each set of unique data values on these columns has a single row in the query table. Derived columns should be designated by numbers indicating relative position, "1," "2," "5," for first, second, and fifth column, respectively. For example:

Select columns	**Month(sick_date), Count(*)**
from tables	**sickdays**
group by columns	**1**

This query causes MapInfo to count all the records recorded for a particular date and produce a query table grouped by those dates. There is one row per date, and that row has a column indicating how many people were sick on that day.

In Group by columns, you should refer to columns by their name or by a number. When you aren't using a join, you can use regular field names. When you are grouping by the value of a derived column or if

you are joining tables, you must use a numerical designator. When referring to columns by number, do not prefix the number by "col." Use the numbers alone.

You can list more than one column. MapInfo first groups records by the first column you list. Within those groupings, it groups records by the second column, and so forth. For each resulting row, the query table contains aggregate values for all columns based on aggregate functions.

Note: Columns in the Select Columns box that are based on aggregate functions cannot be listed in Group by column. However, all other columns should be listed in Group by columns.

Order by Columns

By using an Order by columns clause you can specify the order in which MapInfo lists the records in the query table. By default, MapInfo orders records by their ascending value (alphabetical order for character fields). When you list more than one column, MapInfo first orders the records by the first column. Records with identical values in the first named column are ordered by their values in the second column. Records with identical values in the second column are ordered by their values in the third column. There is no limit to the number of columns you can use.

In Order by columns, you should refer to columns by their name or by a number. When you aren't using a join, you can use regular field names. When you are ordering by the value of a derived column or if you are joining tables, you must use a numerical designator. When referring to columns by number, do not prefix the number by "col." Use the numbers alone. Note that you can order your result by a field that isn't in Select columns.

When you want to have columns ordered in descending order, place the keyword "desc" after the column designator:

order by columns: STATE desc

order by columns: POP_1990 desc

order by columns: 3 desc

The first statement orders the records by state name, starting with Wyoming and ending with Alabama. The second statement orders records by 1990 population, listing the record with the highest population value first. The third statement orders the records in descending order by the values in the third column. Notice that "desc" is separated from the column name (or number) by a single blank space.

You can also use the "asc" keyword to have a column sorted in ascending order. You use "asc" the same as you would "desc". By using "desc" and "asc" you can sort by one column in ascending order, by another in descending order, then back to ascending order, and so forth.

Naming the Query Table (Into Table Named)

Finally, you can name the query table. When you don't type in a name, MapInfo puts the results in the temporary table selection, and windows based on that selection are designated "Query1", "Query2", etc. When you want a more descriptive name, enter it here.

Aggregate Functions

Use aggregate functions when you want to summarize data. You place an aggregate function in the Select columns box in the SQL Query dialog. Imagine that you have a table of customer orders. Each row in the table represents a single order. One column in the table contains the name of the sales representative who booked the order, another contains the name of the customer, and yet another contains the order amount.

You want to find out:

- How many orders were booked by each sales representative
- The average amount of the orders
- The total value of the orders

The following SQL Select gives you that information:

Select columns	**Sales_Rep, count(*), average(AMOUNT), sum(AMOUNT)**
from tables	**Orders**
group by columns	**Sales_Rep**

Notice the three aggregate functions in Select columns and the Group by columns. What MapInfo does is:

1. Find all the rows for a particular sales representative.
2. Count the number of rows: count(*).
3. Calculate the average value of orders for the sales representative: average(AMOUNT).
4. Calculate the total value of the orders for the sales representative: sum(AMOUNT)

MapInfo does this for each representative and produces a results table that has a single row for each sales representative. The aggregate functions aggregated the data values for all of the rows having the same value for Sales_Rep.

Consider this SQL Select:

Select columns	**Customer, count(*), average(AMOUNT), sum(AMOUNT)**
from tables	**Orders**
group by columns	**Customer**

This is essentially the same query as the previous one, except that we are grouping by Customer rather than by Sales_Rep. This SQL Select finds the count, average, and sum of orders for each customer rather than for each sales representative.

The following example illustrates SQL Select:

Select columns	**Sales_Rep, Customer, count(*), average(AMOUNT), sum(AMOUNT)**
from tables	**Orders**
group by columns	**Sales_Rep, Customer**

We have specified two columns in Group by columns. In this case, MapInfo groups rows first by sales representative and then by customer. The result table for this query has one row for each different customer/sales representative combination. When a particular customer has ordered through two or more sales representatives, there is a row summarizing that customer's business with each sales representative. The rows are grouped first by sales representative and then, for each representative, by customer.

MapInfo's Aggregate Functions

MapInfo has the following aggregate functions:

- count(*): simply counts the number of records in a group. It takes * as its argument simply because it applies to the record as a whole and not to any particular field in the record.
- sum (<expression>): calculates the sum of the values in <expression> for all the records in a group.
- average (<expression>): calculates the average of the values in <expression> for all the records in a group.
- max (<expression>): finds the highest value in <expression> for all records in a group.
- min(<expression>): finds the lowest value in <expression> for all records in a group.

Joining Tables

When you are joining tables where there is a one-to-one correspondence between the rows in the tables, the result table has the same number of rows as the tables being joined. When there is a many-to-one correspondence between the tables, two results are possible. When you use aggregate functions, the result table has no more rows than are in the shorter of the tables being joined. When you do not use aggregate functions, the result table has as many rows as are in the longer of the tables.

Geographic Operators

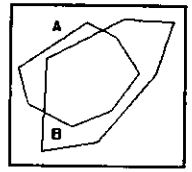
Geographic operators allow you to select objects on the basis of their spatial relationship to some other object. MapInfo has a special keyword you use with geographical operators: "obj" or "object". This keyword tells MapInfo that it has to get values based on the graphical objects in the table rather than the tabular data.

The geographic operators go between the objects being specified. Select the geographic operators from the Operators menu.

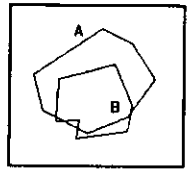
Here are the geographic operators:

Contains	Object A Contains object B if B's centroid is anywhere within A's boundary.
Contains Entire	Object A Contains Entire object B if B's boundary is entirely within A's boundary.
Within	Object A is Within object B if it is centroid is inside B's boundary.
Entirely Within	Object A is Entirely Within object B if A's boundary is entirely within B's boundary.
Intersects	Object A Intersects object B if they have at least one point in common or if one of them is entirely within the other.

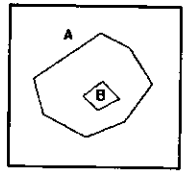
The difference between Contains and Within on the one hand, and Contains Entire and Entirely Within on the other, hinges on how the geographic comparison is made. For Contains and Within, the comparison is based on object centroids. For Contains Entirely and Entirely Within, the comparisons are based on the whole object. The following graphic illustrates this point:



Object A contains objectB
Object B within objectA



Object A contains object B
Object B within object A



Object A contains Entire object B
Object B entirely Within object A
Object A intersects objectB
Object B intersects objectA

In each case, object A contains object B because the centroid of object B is inside the boundary of object A. However, in the cases at the left and in the middle, part of object B is outside the boundary of object A. Only in the case to the right is all of object B inside object A. Only in this case could we assert "object A Contains Entire object B" or "object B Entirely Within object A." Further, if A contains entire B, then A contains B, and If A is entirely within B then A is within B.

However, MapInfo can perform a simple Contains or Within comparison more rapidly than a Contains Entire or Entirely Within. Therefore, unless you must be absolutely sure that objects are completely inside other objects, you should use Contains and Within rather than Contains Entire or Entirely Within.

Geographic operators are useful in working with multiple tables. When there are no columns in the tables on which you can base your join, you can use a geographical operator to specify the join (in the Where condition). When you are working with a table of cities and a table of states, you could use either of the following:

1. city.obj within state.obj
2. state.obj contains city.obj

In either case, MapInfo finds the cities within each state and then associates a row for a city with the row for the state that contains it. You could use aggregate functions to count the number of cities per state or to summarize city-based data on a statewide basis.

When you have a table of counties and one of customers, where counties are polygons and customers are points, you could specify a geographic join with:

3. customer.obj within county.obj
4. county.obj contains customer.obj

Geographic operators are particularly useful in conjunction with subselects. The following section contains several examples of this.

Subselects

MapInfo allows subselects in SQL Select. A subselect is a select statement that is placed in the Where condition of the SQL Select dialog. MapInfo first evaluates the subselect and then uses those values to evaluate the main SQL Select.

For example, imagine you want to select all states whose population is greater than the average for 1990. In effect, you want to use the following statement in the Where condition:

```
Pop_1990>Average
```

However, you do not know what that average is. But you know that MapInfo can calculate that average using the following aggregate expression:

```
avg(Pop_1990)
```

What you can do is use that aggregate function in a subselect to calculate the average population per state. You would fill in the SQL Select dialog as follows:

Select columns	*
from tables	states
where condition	Pop_1990>(select avg(Pop_1990) from states)

The subselect is in the Where condition following the greater-than (>) operator. Note that you have to type words such as "select" and "from" the subselect into the Where condition. You will not find them on a menu. Finally, the subselect must be enclosed in parentheses.

The most useful subselects contain a select clause, a from clause, and a where clause, as follows:

```
select some columns from some tables where some condition
```

As noted above, you must type "select", "from" and "where" into the subselect.

Consider the following SQL Select, which selects all cities in states with more than 4,000,000 people:

Select columns	*
from tables	cities
where condition	obj within any (select obj from states where POP_1990 > 4000000)

The subselect gets the graphic object for all states with a 1990 population greater than 4,000,000. The main Select statement then gets all the cities that are in any of the states chosen in the subselect. Notice that the main Select statement uses a geographical operator (within) to do this.

Notice also that, while we are working with both the States table and the Cities table, we have only specified the Cities table in From tables. That is because we are not joining the two tables. We are only using States in the subselect.

In the next example, we select all states that intersect Tennessee, that is, all states touching it.

Select columns:	*
from tables	states
where condition	obj intersects (select obj from States where ABBR = "TN")

The main Where condition has the form: obj intersects obj. The second object is, in turn, specified by the subselect: select obj from states where obj='TN". MapInfo uses the subselect to find the graphic object for Tennessee and then uses the main Where condition to find those objects that intersect with it. You could use a similar query to select all street segments that cross some given street.

Now consider this example:

Select columns	*
from tables	county
where condition	county.obj contains any (select obj from dealers)

This query finds all counties containing a dealer. The main Where condition has the form: obj contains obj. The second object is chosen by the subselect: select obj from Dealers. MapInfo selects the row for any county object that contains a dealer object.

Finally, here are a few notes on subselects:

1. You can use tables in the subselect that aren't listed in From tables for your main Select. You must, of course, list these tables in the From clause of your subselect.
2. When the subselect is used with the "any" or "all" keywords, it must return one and only one column. The following example would not be valid:

   ...any(select abbr, pop_1990 from states)
3. When the subselect is not used with "any", "all", or "in", one and only one value can be returned. The following example would not be valid:

   ...obj within (select obj from states where POP_1990 > 4000000)
4. When the subselect is not used with "any", "all", or "in", you cannot use a Group by columns clause in the subselect.

Update Column & SQL Select Query Table

You can use Update Column on the result of an SQL Select multi-table join. When you want to update a column in one table with information from another table, you can:

1. Join the tables with SQL Select.
2. Use Update Column on Selection. The update automatically takes effect in the appropriate base table.

Startup.Wor

STARTUP.WOR ("Startup Workspace" on the Macintosh, "Startup.workspace" on Sun and HP) is a name you give to a workspace from which MapInfo is run. You can create it so that MapInfo automatically opens various tables and windows on startup. When you use STARTUP.WOR, MapInfo performs the startup actions regardless of what you did in your previous MapInfo session or how you have set preferences for MAPINFO.WOR.

To create such a workspace:

1. Open MapInfo.
2. Open whatever tables and windows you want in your workspace. Size and position them as you please.
3. Choose Save Workspace As on the File menu.
4. Name your workspace "Startup" and save the workspace into your "home" directory.

Note: By "home" directory we mean your private Windows directory on a PC or the System Folder on the Mac. On Unix, "home" is the directory from which MapInfo is run.

You can also use a startup workspace to run a MapBasic application. However, you cannot create this kind of workspace using Save Workspace As. When you want to run a MapBasic application in your startup workspace, you need to create the workspace with a text editor:

1. You should place the following into an ASCII file:

   ```
   !workspace
   !version 200
   run application "someprog.mbx"
   ```

   "Someprog.app" is the name of the MapBasic application you want to launch from the startup workspace.
2. Name this file STARTUP.WOR ("Startup Workspace" on the Macintosh, "Startup.workspace" on Sun and HP).
3. Place this file in your MapInfo program directory or in your home directory.

When you run MapInfo, MapInfo does the following in the order shown:

1. If there is a STARTUP.WOR in the MapInfo program directory, it is run.
2. Then, if there is a STARTUP.WOR in your home directory it is run. (When there is a STARTUP.WOR in both the MapInfo program directory and your home directory, both are run.)
3. Then, if any file names are given on the command line—or MapInfo was launched by double-clicking a document in the Macintosh Finder— those file(s) are loaded. MapInfo support adding workspaces (.WOR), running applications (.APP), and opening databases (.TAB) on the command line.
4. Only if MapInfo did not add a workspace or run a program from the command line does it then check the AutoLoad preference and load MAPINFOW.WOR from the user's home directory. When the preference is set, and the file is found, it is loaded.

Note that if we had a workspace or application on the command line, we skip the AutoLoad.

5. Finally, if MapInfo didn't load a workspace or run an application from the command line, and it didn't AutoLoad MAPINFOW.WOR, then MapInfo shows the Tool palette.

Symbol Tool

Menu Path

Tool palette

Tool Enabled If ...

An editable Mapper is active.

A layout is active.

Purpose

The Symbol tool allows you to place point symbols ("push pins") on a map.

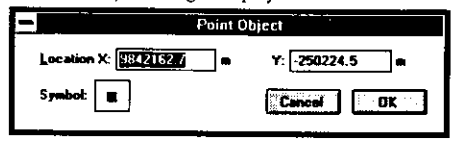
Using the Symbol Tool

Simply select the Symbol tool from the Tool palette, and click on the position where you want the pin to go. The symbol appears in the current default symbol shape, size, color, etc. You can set the size, color, and form of the symbol from Style >Symbol.

Attributes of Point Objects

To access the Point Object dialog, use the Select tool and double-click on the object.

The Point Object dialog is displayed:



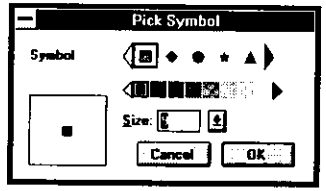
Location X: Location of the point on the X axis.

Y: Location of the point on the Y axis.

Symbol: Displays the symbol that is currently selected.

To change the symbol, click on the Symbol box in the Point Object dialog.

The Pick Symbol dialog is displayed:



2. Click on the desired symbol to select it.

The symbol is displayed in the box in the lower-left corner of the dialog.

Text Style

Menu Path

Style > Text Style

Option Enabled If ...

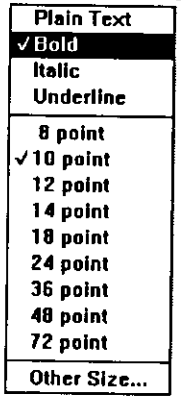
Always.

Purpose

Text Style allows you to change the default drawing font and the style of selected text.

Using Text Style

The Text Style command lets you select the size and style of the active font. When activated, Text Style places a menu of styles and sizes next to the Style menu. Drag the cursor onto the style or font-size portion of the menu and release it to make your selection. Text Style is an easy way of changing the font of existing text.



In this case, or in the case of many text style changes, it may be easier to activate the Font Picker, using the Pick Font command on the Style menu. Also, if you want to change the color of the text and/or the color of the text's background, you will have to use the Font Picker.

Text Tool

Menu Path

Tool palette.

Tool Enabled If ...

An editable Mapper or editable Browser is active, or if a Layout is active.

Purpose

The Text tool allows you to add titles, labels, and annotation to maps and Layouts. You can also use the Text Tool to edit the data in a Browser.

Using the Text Tool in Mappers and Layouts

The Text tool can create single and multi-line text objects.

1. Select the Text tool from the Tool palette.

The cursor turns into an I-beam.

2. Click the cursor at the place on the map where you want the text to be drawn. A flashing cursor appears.
3. Type.

The text will appear at the flashing cursor as you type. When you want to move to a new line of text, simply press <ENTER>.

4. Click-on <ESCAPE> or click the mouse somewhere else on the map when you are finished typing.

The font used is the current font, as indicated in Style > Text Style and Style > Font, or through Style > Pick Font, accessible from the Style menu. To change the text object's font, select it and choose another font.

Setting Line Spacing, Alignment, and Rotation Angle

Once you have created a text object, you can use the Text Object attributes dialog (see page 276) to set the line spacing, alignment, and rotation angle of the text.

Single spacing is the default value for line spacing. You can also choose one-and-a-half or double spacing.

Left alignment is the default value for text alignment. You can also choose center or right alignment.

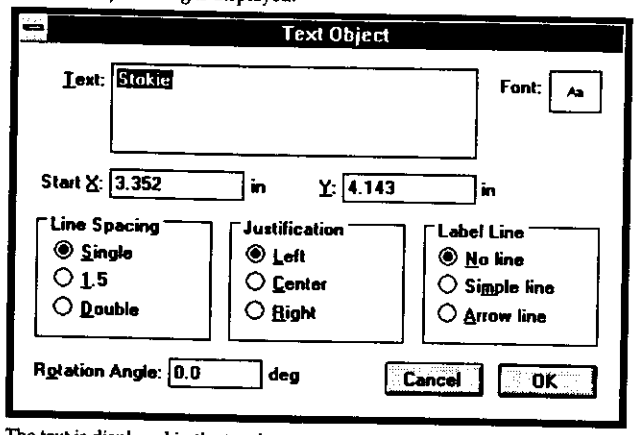
If you want text that is at some angle other than horizontal, you can choose a rotation angle.

Editing Text

To edit the text you have just created:

1. Activate the Select tool from the Tool palette.
2. Double-click on the text.

The Text Object dialog is displayed:



The text is displayed in the text box.

3. Position the cursor in the text box and make your changes.

When you are finished:

4. Click OK.

Creating Call-Outs

If you want to create call-outs (labels with pointers to the objects they designate) you can do so with the Text tool:

1. Position the Text tool at the place on the map you want labeled.

Type the text you want as the call-out.

2. Double-click on the text with the Select tool to bring up the Text Attributes box.

In the Text Object attributes dialog, you see Label Lines, with three options:

- No Line (the default)
- Simple Line
- Arrow Line

Choose Simple line or Arrow line. (Arrow line has a head at one end of the line, Simple line does not.)

3. Close the dialog and return to the map.

4. Select the text object and position it as you please.

MapInfo will draw a line from the new position of the text object to its original position.

Using the Text Tool in a Browser:

Use the Text tool to enter and edit text in Browsers. You do this one field at a time.

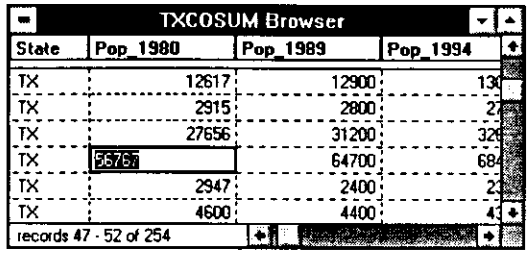
1. Click on the Text tool.

The arrow becomes an I-bar.

2. Click on the field you want to edit.

That field is outlined by a solid box (see illustration).

3. Edit the text in the box.



Use the <TAB> key to move from field to field. Use Edit > Save to save your edits.

Text Size

Text size is handled differently in Mappers and Layouts. You should keep these differences in mind if you want to fine-tune text size in Mappers and Layouts.

Text Size in Layouts

In the Layout, the point size of the text is specified relative to the actual size of the page (that is, the size in which it will print), just as it is in word processing and desktop publishing programs. When you zoom in and out on a Layout, the text will be larger or smaller on the screen, but its specified point size (as indicated in its attributes box) remains the same.

Text Size in Mappers

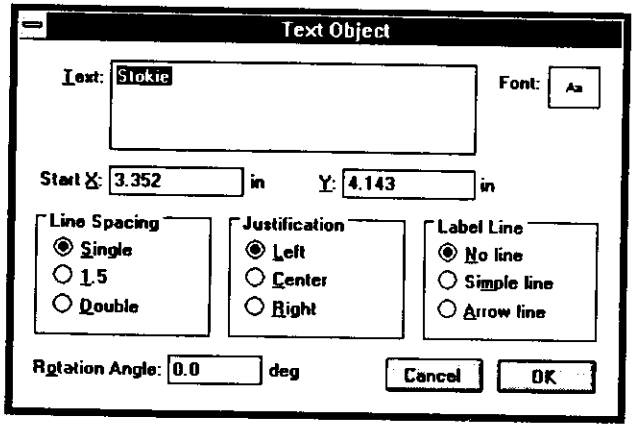
In Mappers, text size is specified relative to the screen. When you zoom in and out on a Mapper, the size of the text will change. So will its specified point size. If you zoom in, text will appear larger, as will all visible elements of the map, and the point size of the text (as indicated in its attributes box) will be appropriate to the text being displayed on screen.

Attributes of Text Objects

To access the Text Object dialog:

- Use the Select tool and double-click on the object.

The Text Object dialog is displayed:



Specifying Text Object Attributes

Start X, Y: The X-Y coordinates of the upper-left corner of the text object.

Text: The text itself. Once a text object has been created, you can edit it through this text box.

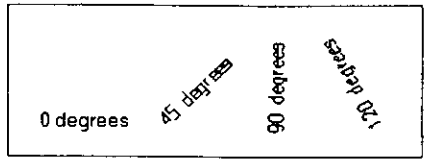
Line Spacing: Choose Single, One and a half, or Double. Single is the default value.

Justification: Choose Left, Center, or Right. Left is the default value and will cause successive lines of text to be aligned to the left border of the text object. Similarly, Right will cause successive lines of text to be aligned to the right border of the text object. Center will cause successive lines of text to be aligned to the center of the text object.

Label Line: The three options determine what type of label line, if any, you will have. See the discussion above on creating call-outs.

Font: This box displays the current font and style. When you click on this box, MapInfo displays the Font Picker dialog. You can change the font and style through that dialog.

Rotation Angle: Enter the rotation angle here. MapInfo measures angles starting from horizontal and going counter-clockwise, as follows:



When you use Windows 3.0, all rotated text will be displayed and printed only in vector fonts, regardless of the font you set it to be. Those are the only fonts Windows can rotate. For many users Modern is the only vector font; if you do not have it installed, you should install it. However, your printer may have rotatable fonts which are not available to the screen. Those fonts will print, but they will not display on the screen. If you have libraries like Adobe's Type Manager or Bitstream's Facelift, more rotatable fonts will be available to you.

Tile Windows

Menu Path

Window > Tile Windows

Option Enabled If...

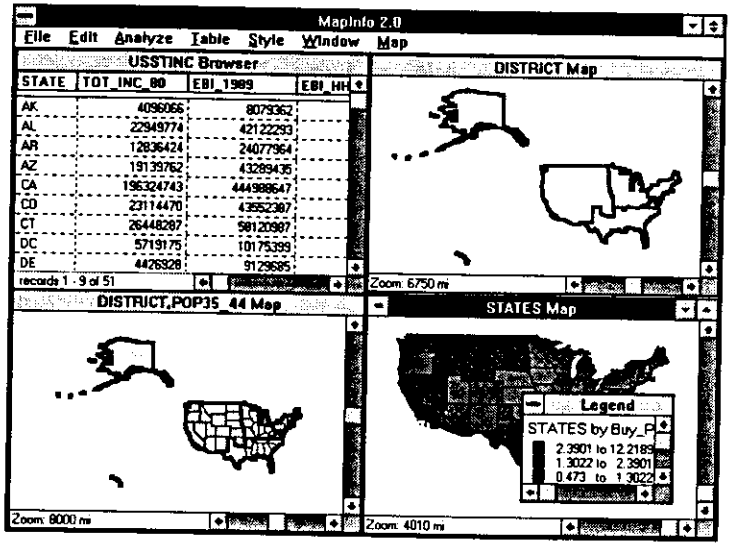
At least one of the following is open: Browser, Mapper, Grapher, Help, Layout or MapBasic.

Purpose

Tile Windows allows you to organize the windows on your screen and/or to expose windows that have become hidden under other windows.

Using the Tile Window Command

Tile Windows resizes and arranges all the windows next to one another on the screen so that each window is displayed.



Undo

Menu Path

Edit > Undo

Option Enabled If...

An "undoable" operation has been performed. (Redo is enabled if an Undo has been performed)

Purpose

Undo allows you to undo the last edit operation.

Using the Undo command

The Undo command reverses the last edit operation. The actual name of this command changes to let you know exactly what operation you will be undoing. After a Paste, for example, the name of this command changes to Undo Paste. Once you have undone something, the name of this command changes to Redo. If there is nothing to Undo, this command will be grayed out.

Remarks

You cannot undo Revert, Save, Save As, or Modify Table, or any operations whose effects are primarily cosmetic. Changes made in a Browser through Pick Fields, or changes of view in a Mapper cannot be undone.

Unselect All

Menu Path

Analyze > Unselect All

Option Enabled If ...

A Browser is active, and at least one row is selected.

A Mapper is active, and at least one object is selected.

A Layout is active, and at least one object is selected.

Purpose

Unselect All allows you to unselect the currently selected objects in a Mapper or Layout or the rows in a Browser.

Using Unselect All

To unselect the currently selected objects.

- Click on the Analyze menu.
- Click on Unselect All.

Other ways of unselecting are:

- Mapper and Layout: click with the Select tool where there are no objects.
- Browser: select a row, which makes it the only selected row in the Browser. Press <SHIFT> and select the row again. This deselects the row.

Unsmooth

Menu Path

Edit > Unsmooth

Option Enabled If ...

The Mapper is active, the layer is editable, and an editable object is selected. Unsmooth is enabled when any object is selected, but it does not do anything to any object other than a smoothed polyline.

Purpose

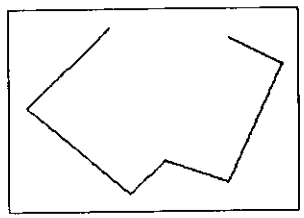
Unsmooth allows you to display the original polyline. While it is not necessary, in some cases it might be easier to reshape a smoothed polyline by returning it to an unsmoothed state. Unsmooth allows you to do this.

Using Unsmooth

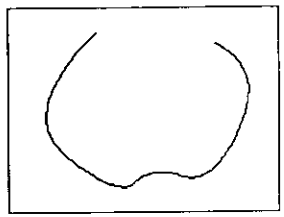
To unsmooth a polyline:

- Select a smoothed polyline in an editable layer.
- Choose unsmooth from the Edit menu.

MapInfo unsmooths it.



Polyline



Polyline which has been smoothed

Update Column

Menu Path

Table > Update Column

Option Enabled If ...

At least one editable table is open.

Purpose

Update Column allows you to assign values to a column and enter graphics information into columns for descriptive data. (See discussion of this below.)

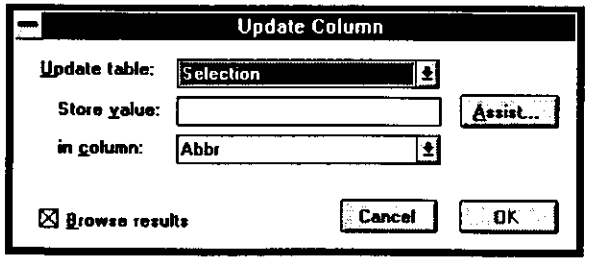
Using Update Column

You can use Update Column after selecting a subset of a table. For example, you could marquee the southeast of the United States, then use Update Column to set the "sales rep" field to the name of your sales representative for that selection.

You can update all the rows in a table or a selection of rows. To update a selection of rows you need to select the rows—using Select, SQL Select, the Select tool, the Polygon Search Select tool, or the Radius Search Select tool—and then update the selection. You cannot update:

- ASCII files
- Excel and Lotus files
- StreetInfo tables
- Tables formed using SQL Select with a Group By clause
- Read-only tables

When you select Update Column from the Table menu, the Update Column dialog displays:



Specifying Update Column Attributes

Update table: Use this menu to select the table you want to update.

Store value: Type in the column or expression you want or press Assist. When you press Assist, MapInfo displays the Expression dialog, which you can use to construct a query

expression. MapInfo will then place the results of the query in the columns specified in the In Column line.

In column: Use this menu to pick the column where your results will be stored. This is the column being updated.

Browse results: Check the Browse results box (its default state) in the Update Column dialog when you want to display a Browser of the updated table. If you do not want to see the Browser, uncheck the box.

Update Column & SQL Select Query Table

You can use Update Column on the result of an SQL Select multi-table join provided the SQL Select didn't have a Group By clause. Thus, if you want to update a column in one table with information from another table, you can:

1. Join the tables with SQL Select.
2. Use Update Column on Selection. The update will automatically take effect in the appropriate base table.

Using Update Columns to Get Graphic Information into Visible Columns

One non-obvious use of Update Columns is to get graphic information into visible columns. Tables containing graphic objects (that is, maps) store graphic information that is not visible in Browsers. You can get some of that information into columns so that information can be viewed in a Browser. For example, you can use the "CentroidX(obj)," and "CentroidY(obj)" operators to put longitude and latitude information into browsable format.

To put longitude and latitude information into browsable format:

1. Use Modify Structure to add the new columns to your database.
2. Use Update Column to place the graphic information, such as area, perimeter, or length, into the new columns

Note: If you do this and then edit your objects, the information in the visible columns must be updated to reflect the changes you have made.

Value Axis

Menu Path

Graph > Value Axis

Option Enabled If ...

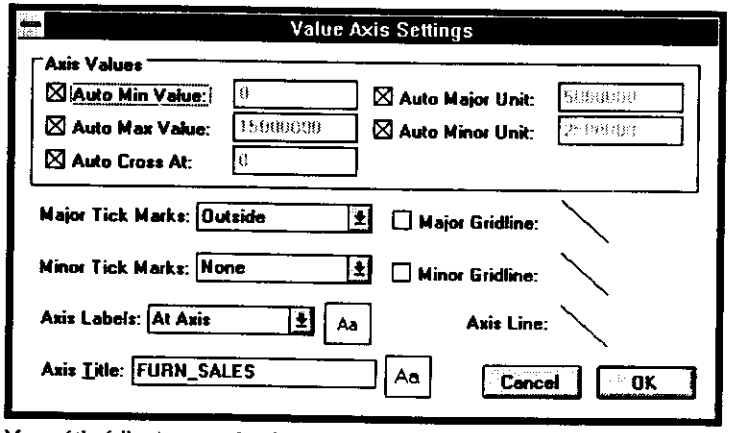
A Grapher is the active window.

Purpose

Value Axis allows you to change the labels, tick marks, and grid lines of the value axis (generally the Y axis) of a graph.

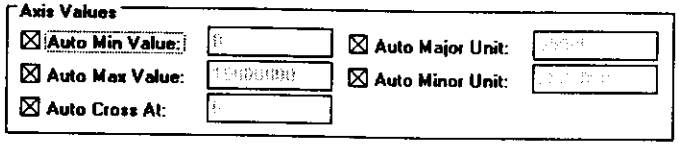
Setting Value Axis Options

When you choose Value Axis, the Value Axis Dialog is displayed:



Many of the following are only relevant if the graph is an X-Y graph — bar, line, area, and pie graphs would use almost none of the following for the label axis, although bar, line, and area would use all of the following for the value axis.

A dialog appears, and you set the following:



- Select (check) the box to have MapInfo automatically compute a value,

  or,

- Select (uncheck) the box and type in the value you want.

Specifying Value Axis Attributes

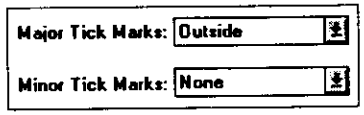
Auto Minimum Value: This is the lowest value to appear along the Label axis.

Auto Maximum Value: This is the highest value to appear on the label axis.

Auto Major Unit: The Major Unit is the increment between major ticks.

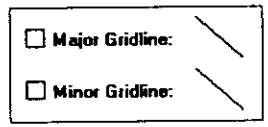
Auto Minor Unit: The Minor Unit is the increment between minor ticks.

Auto Cross At: This is the place on the label axis where it is crossed by the value axis.



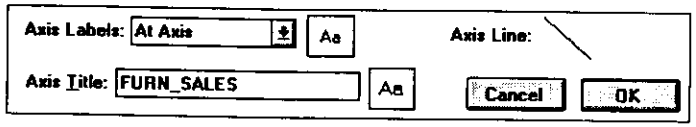
Major Tick Marks: Can set to off (None), to appear inside the axis, to appear outside the axis, or to cross the axis.

Minor Tick Marks: Can set to off (None), to appear inside the axis, to appear outside the axis, or to cross the axis.



Major Gridline: Check to have gridlines drawn at major ticks. To set the pen of the gridlines, click on the adjacent line to activate a pen selection dialog. To get gridlines, you must have the Grapher set to display major tick marks.

Minor Gridline: Check to have gridlines drawn at minor ticks. To set the pen of the gridlines, click on the adjacent line to activate a pen selection dialog. To get gridlines you must have the grapher set to display minor tick marks.



Axis Labels: Can set to have no labels (None) or to have the labels appear At Axis. To set the type style of the axis labels, click on the sample text ("Aa") to get the Font picker, which you can use to set the size, font, and style of your labels.

Axis Line: Click on the accompanying line to call up a pen selection dialog in which you can set the pen that draws the axis and its ticks.

Axis Title: Type in the title of this axis. This will appear adjacent to the axis. Set the text styling of this title by clicking on the "Aa" font display — this brings up a Font Picker dialog.

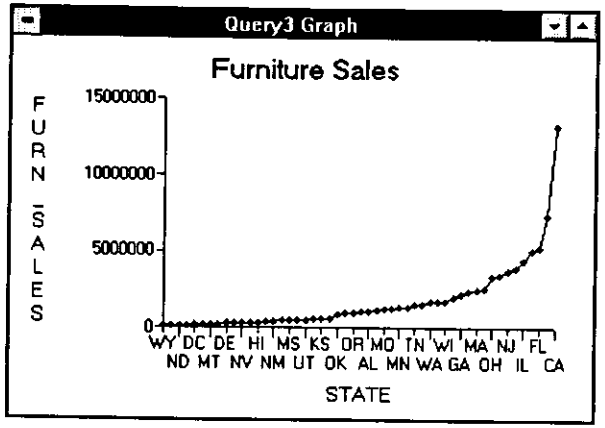
Cancel: Cancels the settings you have made in this dialog and removes the dialog box.

OK: Creates the graph with current specifications.

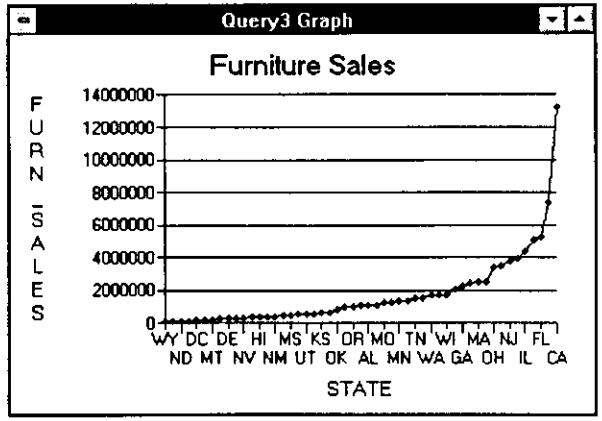
Value Axis Options in Action

There are many possible combinations of the value axis options. The following series of graphs illustrates a few possibilities.

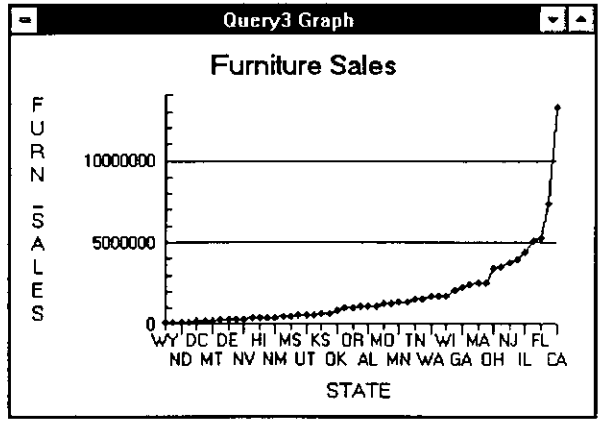
The illustration below is a simple line graph. Notice that it is difficult to determine the value of the data points.



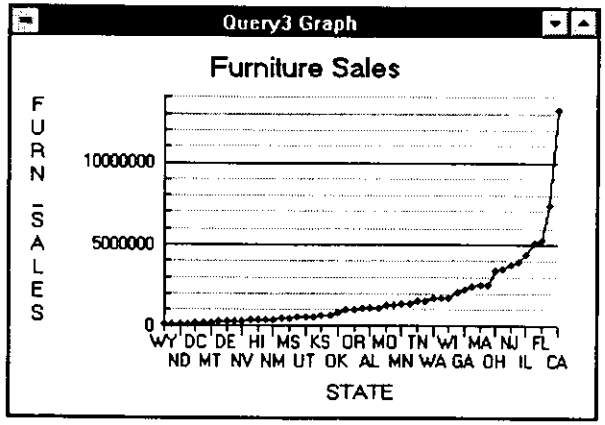
In the following graph we have changed the major unit from 5,000,000 to 2,000,000 and added gridlines at the major units:



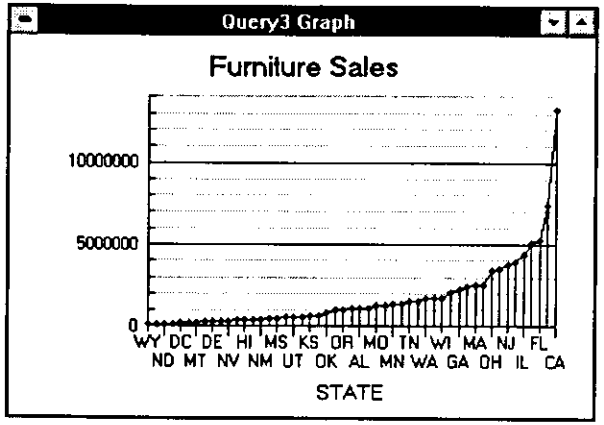
In the next graph we have set the major unit to 5,000,000, with gridlines displaying at the major units and tick marks at the minor units, which is 1,000,000. The tick marks are inside the axis for both major and minor units.



The following graph is like the preceding one, except that we have added a light gridline indicating minor units:



For the last graph we have added drop lines to the preceding graph. (Using the Drop Lines option in the Graph Type dialog.) We have also removed the axis label (along the left edge). This creates a little more room for the graph itself. The graph is a bit busy, but you can readily link data points with the states they represent.



If this graph were wider, it would display the abbreviation of each state along the label axis. If you were to print this graph directly from MapInfo, it would be wide enough to display all of the abbreviations. And MapInfo would print them even though they do not show on the screen.

View Actual Size

Menu Path

Layout > View Actual Size

Option Enabled If ...

A Layout is the active window.

Purpose

View Actual Size allows you to display the Layout so that objects appear at their actual size. Their actual size is the size at which they print out.

Using this option is equivalent to setting the Current Zoom in Display Options to 100%.

View Entire Layer

Menu Path

Map > View Entire Layer

Option Enabled If ...

A Map is the active window.

Purpose

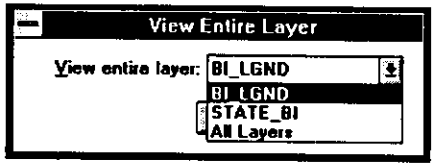
View Entire Layer allows you to zoom and display an entire layer. You may want to do this for aesthetic reasons — to get a map pleasingly positioned in the Mapper, or to reorient yourself.

Using the View Entire Layer Command

To access the View Entire Layer dialog:

- Choose View Entire Layer from the Map menu.

The View Entire Layer dialog is displayed:



- Choose a layer to zoom from the View entire layer menu.

View Entire Layer zooms and centers a layer so that it will display within the current Mapper. If you get "lost" in a map, fitting the map to the window will help you get reoriented.

In the dialog, you can pick an individual layer to view or pick All Layers to view the entire map. This option is important because your Mapper might contain layers that cover different amounts of territory. You might, for example, have a Mapper containing New York counties and highways, and ZIP Codes and streets for Utica. If you choose All Layers, MapInfo will zoom you out to see the entire map. But if you are only interested in viewing Utica streets, you should pick that layer. Then MapInfo will zoom out only as far as needed to display those streets.

Remarks

Many maps, such as MapInfo's StreetInfo maps, are so large that View Entire Layer will take an interminable amount of time to display when zoomed out all the way. We suggest that you use View Entire Layer, then interrupt the display of the map (by <ESC> or by pressing the right mouse-button), and zoom in on the section you are interested in.

View Entire Layout

Menu Path

Layout > View Entire Layout

Option Enabled If ...

A Layout is the active window.

Purpose

View Entire layout allows you to zoom out of the Layout to display all pages in the window.

Zoom-in Tool

Menu Path

Tool Palette

Tool Enabled If ...

A Mapper is active.

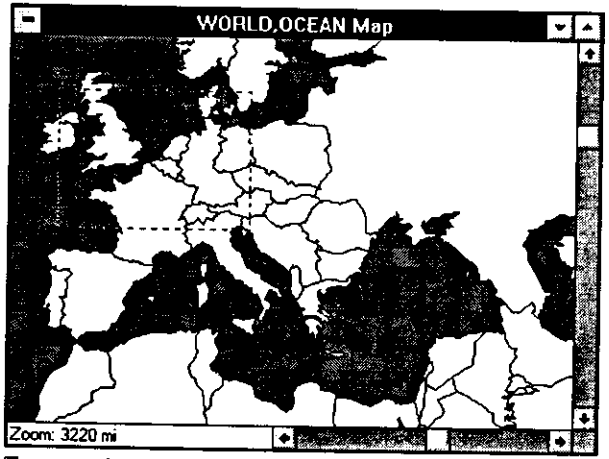
Purpose

The Zoom-in tool allows you to magnify a map.

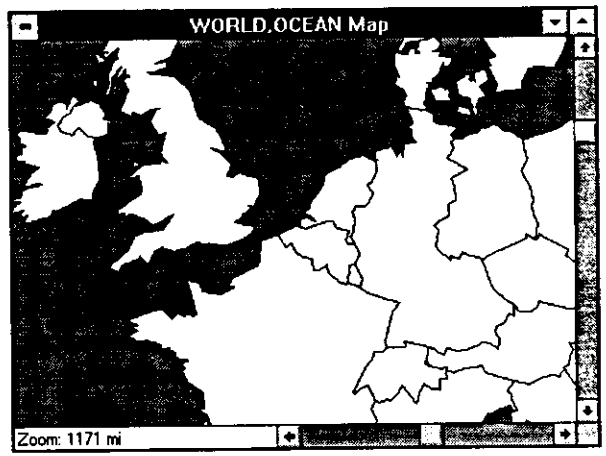
Using the Zoom-In Tool

The Zoom-in tool functions in two ways:

- You can magnify an area by a factor of two simply by clicking the Zoom-in cursor on the center of the area you want to zoom in on. This point will be at the center of the Mapper in the zoomed-in view. You can repeat this procedure until you have the desired level of enlargement.
- You can magnify a particular rectangular area. Draw a marquee around the area by dragging the Zoom-in tool diagonally across it. MapInfo then enlarges the selected area to fill the map window.



The area enclosed by the dotted rectangle is the area we are zooming in on.



MapInfo has zoomed in on the map image so that the area enclosed by the zoom-in marquee now occupies the entire Mapper.

Zoom-out Tool

Tool Enabled If ...

A Mapper is active.

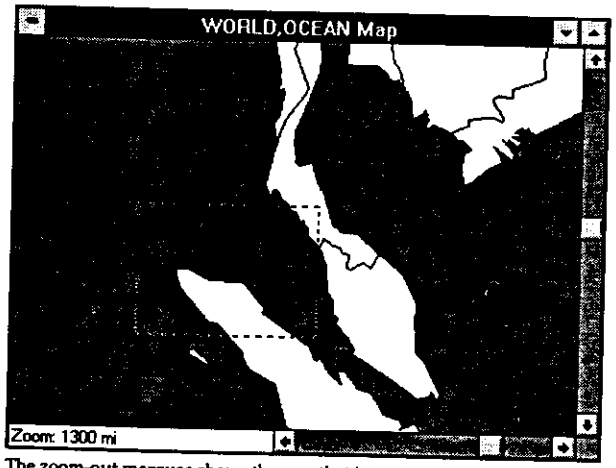
Purpose

The Zoom-out tool allows you to get a larger view of the map into the Mapper.

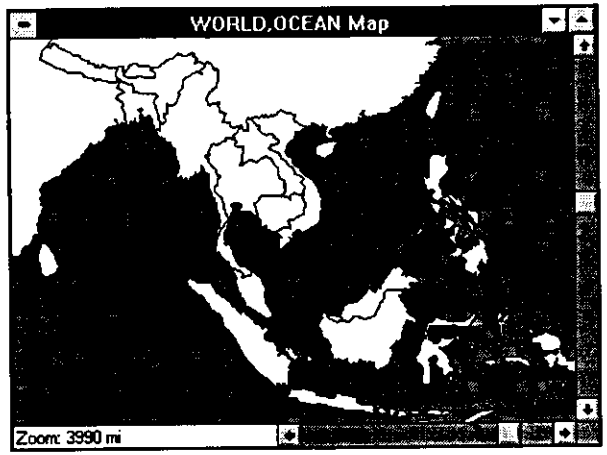
Using the Zoom-out Tool

The Zoom-out tool functions in two ways:

- You can increase the visible area of the map by a linear factor of two simply by clicking the Zoom-out cursor on the center of the area you want to zoom out from. MapInfo will redraw the map, placing this point at the center of the Mapper in the zoomed-out view. You can repeat this procedure as desired.
- Alternatively, you can draw a marquee in the Mapper by diagonally dragging the Zoom-out tool. MapInfo will then redraw the map so that the area you started with is positioned within the marquee area and more of the map appears around it.



The zoom-out marquee shows the area that is occupied by the current map image when the zoom-out is complete. That is, the current map image is reduced to that size, and more of the map is displayed.



MapInfo has zoomed out so that the former view is now only a part of the map image.

Appendix 1 MapInfo Data Interchange Format

This appendix describes the data interchange format for MapInfo. In this appendix, you will find information on:

MIF File Header
MIF Data Section
Pen, Brush, Symbol, and Font Codes in MIF
MID File
Sample File

This versatile format allows generic data to be attached to a variety of graphical items. It's ASCII, so it is editable, relatively easy to generate, and works on all platforms supported by MapInfo. Perhaps the best way to understand the MapInfo Interchange Format (MIF) is to study the sample file at the end of this appendix in conjunction with the explanation of the file format. You can also create samples of your own by exporting files to MIF and then examining those files in a text editor.

MapInfo data is in two files—the graphics reside in a .MIF file and textual data is contained in a .MID file. The textual data is delimited data, with one row per record and either Carriage Return, Carriage Return plus Line Feed, or Line Feed between lines. The MIF file has two areas — the file header area and the data section. Information on how to create MapInfo tables is in the header; the graphical object definitions are in the data section.

MIF File Header

This is a description of MIF file header with optional information in square brackets.

```
VERSION n
[ DELIMITER "<c>" ]
[ UNIQUE n,n... ]
[ INDEX  n,n... ]
[ COORDSYS...]
[ TRANSFORM...]
COLUMNS n
  <name> <type>
  <name> <type>
          .
          .
          .
DATA
```

As noted above, you must state whether you are using VERSION 1 or VERSION 2 of the format. Version 2 has optional CoordSys and Transform clauses.

Delimiter

Specify the delimiting character in quotation marks, for example: DELIMITER ";" The default delimiter is Tab; if you are using the default, you do not need the DELIMITER line.

Unique

Specify a number. This number refers to a database column; 3 is the third column, 7 is the seventh column, and so forth. What happens to columns in the UNIQUE list is subtle. For example, imagine that you have a database with highways in it. Each highway has only one name, but it might be represented by several segments. You would put the NAME column in the UNIQUE list, while the column containing data for the individual segments would not be in that list. This has the effect of creating two related tables; one with names, and one with the other attributes of the objects. This is how MapInfo's various street maps (StreetInfo) are prepared.

Index

Specify a number. This number refers to a database column; 3 is the third column, 7 is the seventh column, and so forth. Columns in the INDEX list will have indexes prepared for them.

CoordSys Clause

Specify the COORDSYS clause to note that the data is not stored in longitude/latitude form. When no COORDSYS clause is specified, data is assumed to be stored in longitude/latitude forms.

All coordinates are stored with respect to the northeast quadrant. The coordinates for points in the United States have a negative X while coordinates for points in Europe (east of Greenwich) have a positive X coordinates for points in the Northern hemisphere have a positive Y while coordinates for points in the Southern hemisphere have a negative Y.

Transform Clause

When you have MIF files with coordinates stored with respect to the northwest quadrant (quadrant 2), you can transform them to the northeast quadrant (quadrant 1) with a transform clause.

Quadrant 2: Northwest Quadrant	Quadrant 1: Northeast Quadrant
Quadrant 3: Southwest Quadrant	Quadrant 4: Southeast Quadrant

The transform clause has the following syntax:

TRANSFORM *Xmultiplier, Ymultiplier, Xdisplacement, Ydisplacement*

To transform quadrant 2 data into quadrant 1 data, use the following transform clause:

TRANSFORM -1,0,0,0

The zeroes instruct MapInfo to ignore that parameter.

When you have an application which creates MIF files in quadrant 2, you can:

Add the TRANSFORM clause to the MIF files

Change the application so that it creates coordinates in quadrant 1

Change the application so that it adds a TRANSFORM clause to the MIF files

Columns

Specify the number of columns. Then, for each column, create a row containing the column name, the column type, and, for character and decimal columns, a number to indicate the width of the field. Valid column types are:

char (width)

integer (which is 4 bytes)

smallint (which is 2 bytes, so it can only store numbers between -32767 and +32767)

decimal (width,decimals)

float

data

logical

This is an example of the columns section of the header:

```
COLUMNS 3
    STATE char (15)
    POPULATION integer
    AREA decimal (8,4)
```

For the database specified in this header, the MID file has three columns:

a 15 character field that represents the STATE column,

an integer field that represents the POPULATION column,

an AREA column that consists of a decimal field with up to 8 total total and 4 characters after the decimal.

MIF Data Section

The data section of the MIF file follows the header and must be introduced with DATA on a single line;:

DATA

The data section of the MIF file can have any number of graphical primitives, one for each graphic object. MapInfo matches up entries in the MIF and MID files, associating the first object in the MIF file with the first row in the MID file, the second object in the MIF file with the second row in the MID file, and so on.

When there is no graphic object corresponding to a particular row in the MID file, a "blank" object (NONE) must be written as a place holder in the corresponding place in the MIF file.

```
NONE
```

The graphical objects that can be specified are:

point
line
polyline
region
arc
text
rectangle
rounded rectangle
ellipse

A **point** object takes two parameters; an X coordinate and a Y coordinate. As an option, specify the symbol that represents the point. Symbols are designated by numbers. When no symbol is defined, the current symbol is used.

```
POINT x y
 [ SYMBOL (shape, color, size)]
```

A **line** objects requires four parameters; an X and a Y coordinate for each end point. As an option, specify a pen type. When no pen type is specified, the current pen type is used.

```
LINE x1 y1 x2 y2
 [ PEN (width, pattern, color)]
```

A **polyline** object requires an X and a Y coordinate for each point in the line. The number of points (numpts) in the polyline follows the PLINE keyword. As an option, specify a pen type and whether the line is smoothed. When the polyline is not explicitly SMOOTH, it is assumed not to be smoothed.

```
PLINE numpts
 x1 y1
 x2 y2
  :
 [ PEN(width, pattern, color)]
 [ SMOOTH ]
```

A **region** object can consist of one or more polygons. Each polygon requires X,Y coordinates for its vertices specified like this:

```
numpts
   coordinate list
numpts2
   coordinate list
```

As an option, specify pen, brush types, and centroid of the region. Specifying the centroid saves time in importing and exporting.

```
REGION #pgons
 numpts1
```



```
 x1 y1
 x2 y2
  :
numpts2
 x1 y1
 x2 y2
  :
 [ PEN (width, pattern, color)]
 [ BRUSH (pattern, forecolor, backcolor)]
 [ CENTER x y ]
```

An **arc** requires the diagonally opposite corners of its bounding rectangle and the beginning (a) and ending (b) angles of the arc in degrees, moving counter-clockwise with zero at three o'clock. As an option, specify the pen type.

```
ARC x1 y1 x2 y2
 a b
 [ PEN (width, pattern, color)]
```

A **text** object requires the text itself between quotes and the diagonally opposite corners of its bounding rectangle. As an option, specify the font.

```
TEXT "<text string>"
 x1 y1 x2 y2
 [ FONT...]
    [ Spacing {1.0|1.5|2.0}]
    [ Justify {Left|Center|Right}]
    [ Angle text_angle]
    [ Label Line {simple|arrow} x y ]
```

A **rectangle** requires the coordinates of the diagonally opposite corners. As an option, specify pen and brush types.

```
RECT x1 y1 x2 y2
 [ PEN (width, pattern, color)]
 [ BRUSH (pattern, forecolor, backcolor)]
```

A **rounded rectangle** requires the coordinates of the diagonally opposite corners and the degree of rounding (a). As an option, specify pen and brush types. Degree of rounding is expressed in coordinate units.

```
ROUNDRECT x1 y1 x2 y2
 a
 [ PEN (width, pattern, color)]
 [ BRUSH (pattern, forecolor, backcolor)]
```

An **ellipse** object requires the coordinates of the diagonally opposite corners of its bounding rectangle. As an option, specify pen and brush types.

```
ELLIPSE x1 y1 x2 y2
 [ PEN (width, pattern, color)]
```

[BRUSH (*pattern, forecolor, backcolor*)]

Pen, Brush, Symbol, and Font Codes in MIF

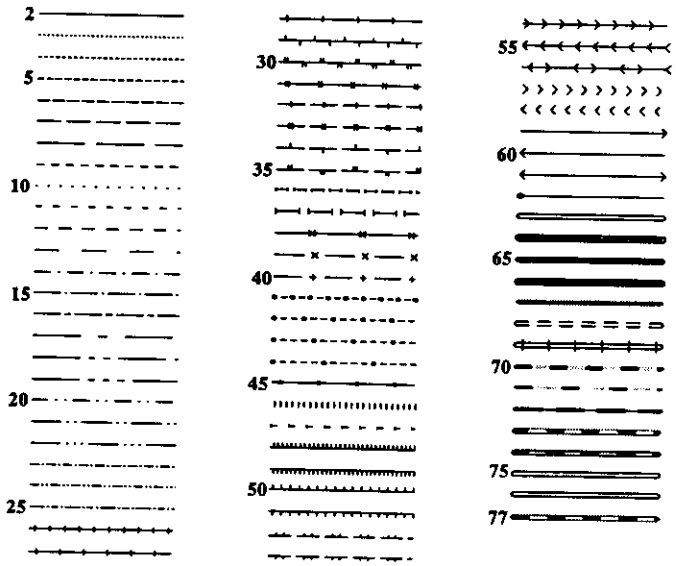
Pen

Pen specifies the width, pattern, and color to be displayed as shown below:

```
PEN (width, pattern, color)
```

Width is a number from 0 to 7, pattern is a number from 1 to 77. The following table contains the patterns or styles listed by their numbers. And , color is a 24-bit RGB value.

The pattern parameter requires a value from 1 to 77. The styles appear in the following table.



Note: The table does not include a sample of pattern number one. Pattern one is the null line style, no line at all.

Brush

Brush specifies the pattern, foreground color, and background color to be displayed as shown below:

```
Brush (pattern, forecolor, backcolor)
```

Pattern is a number 1 to 71. The following table contains the patterns or fill types listed by their numbers. Foreground and background are 24-bit RGB values. With pattern 1, both

colors are ignored. With pattern 2, the background is ignored. When the fill pattern is 1 or 2, the background color is irrelevant.

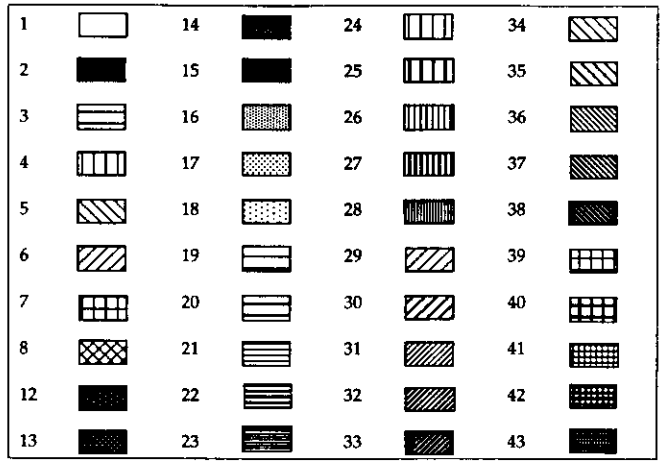


Table 1

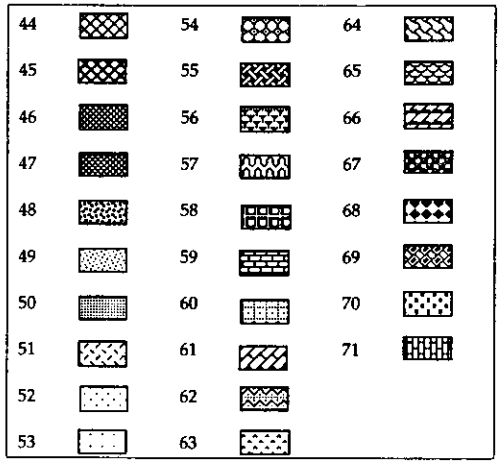


Table 2

The fill type values 9 through 11 are reserved for internal use.

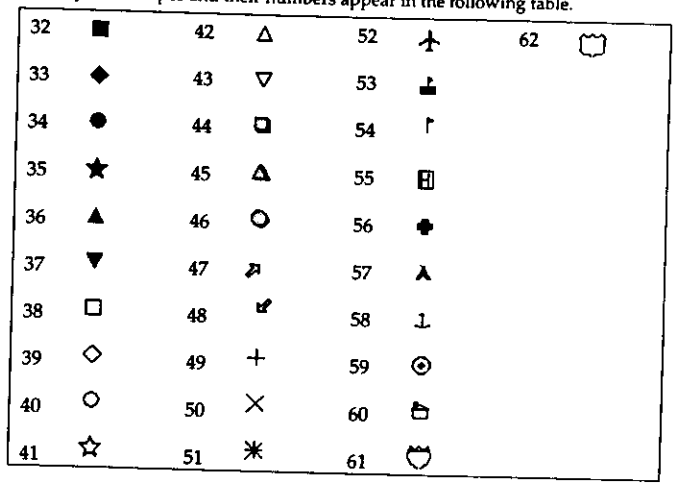
Symbol

Symbol specifies the number, color and size of the symbol to be displayed as follows:

```
SYMBOL (number, color, size)
```

Number is a number from 32 to 62. Color is a 24-bit RGB value. Size is a number from 1 to 48, the point size of the symbol.

The symbol shapes and their numbers appear in the following table.



Font

Font specifies the fontname or typeface, style, size, or pointsize, foreground color and background color as follows:

```
FONT ( "fontname", style, size, forecolor [,backcolor] )
```

Fontname in double quotation marks is the typeface to be displayed. Style is the text attribute of the typeface as shown in the following table. Size must be 0 in a MIF file. Forecolor is the 24-bit RGB color for opaque text.

style	Bold	Italic	Underline	Sample
0				The quick brown fox
1	ON			**The quick brown fox**
2		ON		*The quick brown fox*
3	ON	ON		***The quick brown fox***
4			ON	The quick brown fox
5	ON		ON	**The quick brown fox**
6		ON	ON	*The quick brown fox*
7	ON	ON	ON	***The quick brown fox***

Colors

Color specifies the color of any object to be displayed as follows:

```
Color:  number
```

Colors are often defined in relative concentrations of red, green, and blue. Each color is a number from 0 to 255, inclusive; the RGB value of a color is calculated by the following formula:

(red * 65536) + (green * 256) + blue

These are some often used colors and their values:

Red: 16711680
Green: 65280
Blue: 255
Cyan: 65535
Magenta: 16711935
Yellow: 16776960
Black: 0

MID File

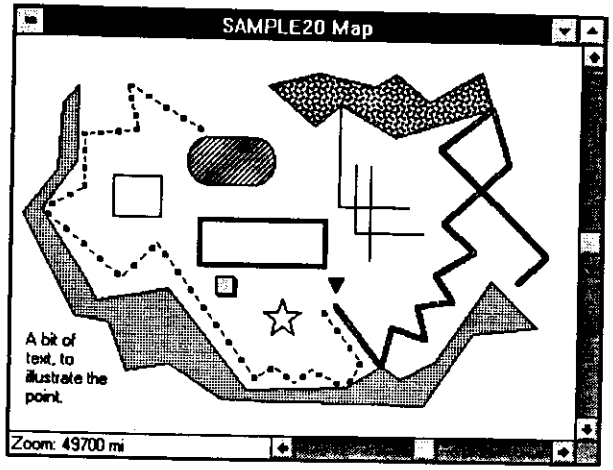
The MID file contains data, one record of dataper row, delimited by the character specified in the delimiter statement. The default delimiter is Tab. Each row in the MID file is associated with a corresponding object in the MIF file; first row with first object, second row with second object.

If delimiter character is included as part of the data in a field, enclose the field in quotation marks.

The MID file is an optional file. When there is no MID file, all fields are blank.

Sample File

This file contains the objects in the following graphic. This file contains a variety of graphic objects to show how data is stored.



The following lists the contents of the .MIF file for this table:

```
Version 2
Delimiter ","
CoordSys Earth Projection 1, 0
Columns 4
  Object_Name Char(15)
  XCOORD Decimal(10, 6)
  YCOORD Decimal(10, 6)
  AREA Decimal(10, 6)
Data

Rect -233.6424 22.648975 -171.655616 77.483407
Pen (1,2,0)
Brush (2,16777215,16777215)
Rect -123.973504 -34.569553 38.145664 22.648975
Pen (1,63,0)
Brush (2,16777215,16777215)
Rect -207.417216 44.105935 -207.417216 46.490063
Pen (1,2,0)
Brush (2,16777215,16777215)
Roundrect -140.662272 65.562895 -26.225152 129.933775 57.218544
Pen (1,2,0)
Brush (33,8421504,16777215)
Pline 15
-123.973504 139.470159
-216.953632 194.304591
-202.649024 137.086095
-271.788064 129.933775
```



```
-271.788064 60.794703
-324.238408 32.185423
-221.721856 -53.642385
-176.423872 -8.344369
-47.682176 -180.000001
-23.841024 -165.695361
2.384128 -184.768209
21.456896 -168.079473
66.754944 -191.920529
83.443712 -158.543041
33.377536 -89.403985
Pen (1,41,0)
Pline 14
52.450304 -84.635761
109.668864 -163.311265
123.973504 -113.245041
166.887424 -127.549665
154.966912 -84.635761
200.26496 -77.483441
176.423808 -44.105969
226.490112 -13.112593
185.96032 22.648975
269.403904 98.940367
245.56288 170.463567
181.192064 118.013199
319.47008 -17.880785
281.324544 -53.642385
Pen (1,75,12632256)
Line 54.834432 172.847631 54.834432 41.721807
Pen (1,2,0)
Line 73.907328 96.556239 73.907328 8.344335
Pen (1,2,0)
Line 92.980096 94.172175 92.980096 -29.801329
Pen (1,2,0)
Line 54.834432 41.721807 143.0464 41.721807
Pen (1,2,0)
Line 73.907328 8.344335 162.119168 8.344335
Pen (1,2,0)
Region 1
  23
-300.397344 168.079439
-305.165568 82.251663
-348.079472 27.417231
-281.324512 -103.708625
-236.026496 -110.860913
-214.569536 -172.847681
-159.735104 -163.311265
-90.596032 -208.609273
164.503296 -213.377485
226.490112 -120.397345
307.549696 -110.860913
247.947008 -51.258289
178.807936 -156.158945
133.509888 -180.000001
109.668864 -163.311265
66.754944 -191.920529
-59.602624 -194.304633
-162.119232 -65.562929
-252.715232 -82.251665
-324.238408 32.185423
-281.324512 94.172175
-281.324512 191.920527
-300.397344 168.079439
```

```
Pen (1,2,0)
Brush (50,0,16777215)
Center -313.038531 -10.728479
Region 1
  11
245.56288 170.463567
123.973504 132.317839
54.834432 172.847631
21.456896 144.238351
-38.145664 196.688719
26.225152 213.377423
97.748352 196.688719
123.973504 213.377423
166.887424 177.615887
231.25824 218.145679
245.56288 170.463567
Pen (1,2,0)
Brush (48,0,12632256)
Center 103.708608 175.231759
Point -87.668352 -62.487047
Symbol (44,12632256,18)
Point -14.92224 -99.792743
Symbol (41,0,36)
Point 52.227968 -58.756487
Symbol (37,0,12)
Text "A bit of"+chr$(10)+"text, to"+chr$(10)+"illustrate
the"+chr$(10)+"point."
-341.347152 -221.036271 -216.373056 -124.041447
Font ("Helve",0,0,0)
```

The following is a listing of the contents of the .MID file for this table:

```
First Rectangle,-202.649000,50.066191,10415810.900000
Second Rect,-42.913920,-5.960289,44044196.700000,
-207.417210,45.297999,0.000000
Rounded Rect,-83.443712,90.000000,0.000000
First Polyline,-112.053020,-90.000000,0.000000
Second Polyline,206.225216,4.768191,0.000000
1 line,54.834432,90.000000,0.000000,
73.907328,52.450287,0.000000
3 line,92.980096,32.185423,0.000000
4 line,98.940416,41.721807,0.000000
5 line,118.013248,8.344335,0.000000
First Polygon,-313.038530,-10.728479,46605467.800000
Second Polygon,103.708608,90.000000,0.000000
1 Symbol,-87.668352,-62.487047,0.000000
2 Symbol,-14.922240,-90.000000,0.000000
3 Symbol,52.227968,-58.756487,0.000000
First Text,-278.860100,-90.000000,0.000000
```


Appendix 2 Converting Files from MapInfo for DOS to MapInfo for Windows

MAP2MIF and BDY2MIF are utility files that convert map files from MapInfo for DOS to MapInfo for Windows. MAP2MIF and BDY2MIF convert MapInfo DOS Mapfiles and Boundary files to MIF files which can be imported into MapInfo for Windows.

Converting MapInfo files from DOS to Windows is a two-step process:

- Convert the Mapfile with MAP2MIF
- Convert the Boundary file with BDY2MIF

Both utilities convert files from DOS to MapInfo Interchange Format, MIF.

Although these utilities translate colors accurately, there are cases when it is best not to use the same colors across platforms. For example, the default background for MapInfo for DOS is black, while the default background for MapInfo for Windows is white.

MAP2MIF

MAP2MIF converts a MapInfo Mapfile from DOS to MIF format. All segments in a Mapfile are converted to LINE objects in the MIF file format.

The table in the MIF file contains six fields: Street char, FromLeft, FromRight, ToLeft, ToRight, and Type.

Street char(40) is the street name. The street type and direction are taken from the MapInfo

FromLeft smallint is the left side address at the beginning of the segment.

FromRight smallint is the right side address at the beginning of the segment.

ToLeft smallint is the left side address at the end of the segment.

ToRight smallint is the right side address at the end of the segment.

Type smallint is the street type, i.e., the street code from the Mapfile.

The Street field is unique and indexed so that address matching can be performed.

The line types and colors of streets, railroads, water, and boundaries default to the following:

- Streets (0): black solid
- Railroads (1): red dashed
- Water (2): blue solid
- Boundaries (3): green solid

To override these defaults, use the /MD option. The line types and colors of negative street types are converted using the personality file and the color table.

BDY2MIF

BDY2MIF converts a MapInfo for DOS Boundary file to MIF format. Closed boundaries are converted to REGION objects, unclosed boundaries are converted to one or more PLINE objects, and boundaries with no segments will have no graphic object associated with them. Use the /NC option to speed the process only when you are sure all boundaries are closed.

The table defined in the MIF file contains two fields: Name char(?) and Id integer.

Name char is the boundary name. The name of this field is "Name" by default. To specify a different name, use the /N option. For example, if a Boundary file contains ZIP codes, it can be named "ZIP".

The width of the name field is the largest width of a boundary name in the boundary file rounded up to the nearest five. To specify a different width use the /NW option.

Id integer is the boundary id.

The name field is indexed. The border types and fill patterns are converted using the personality file and color table.

Using MAP2MIF and BDY2MIF

The command line options are:

```
MAP2MIF mapfile [MIF/MID-file]
        [/A:abbreviation-file]
        [/M:multiplier]
        [/P:personality-file]
        [/MD:road,railroad,water,boundary]
        [/RGB:color-table]
        [/NBW]
BDY2MIF boundary-file [MIF/MID-file]
        [/M:multiplier]
        [/NC]
        [/N:name]
        [/NW:name-width]
        [/P:personality-file]
        [/RGB:color-table]
        [/NBW]
```

MAP2MIF and BDY2MIF Options

/M:multiplier

Specifies the coordinate multiplier to be used in MapInfo for DOS. All MapInfo data uses the default multiplier of 1000000. Use this option if you have produced special data using a different multiplier.

/P:personality-file

Specifies the personality file to be used in translating the codes to colors, lines, and fill patterns. The default personality file, MAPINFO.PER, is the same default used by MapInfo for DOS.

If you use a customized personality file in MapInfo for DOS, you should use the same personality file when running MAP2MIF and BDY2MIF.

/RGB:color-table

Specifies the color table to be used in translating color numbers in the personality file to red/green/blue values in MIF format. The color table format is identical to both MAP2MIF and BDY2MIF MapInfo for DOS. The default color table for 2MIF.RGB differs from the default color table supplied with MapInfo for DOS COLORS.RGB. The red/green/blue percentages used in MapInfo for DOS don't produce exactly the same colors on the GUI platforms.

If you use a customized color table in MapInfo for DOS, you may need to create a modified version for the migration utilities to get the colors to translate properly.

/NBW

tells the MAP2MIF and BDY2MIF not to switch black and white. Use this option if you have a customized personality file that sets the background color to white.

These arguments are MAP2MIF arguments:

/A:abbreviation-file

Specifies the abbreviation file that defines street type and directional abbreviations. Use this option if you use a customized abbreviation file in MapInfo for DOS.

/MD:

Specifies the personality codes to be used for streets, railroads, water, and boundaries, respectively (Line # from personality file, i.e., street codes 0-3). Separate the four codes with commas and leave no spaces. For example:

```
/MD:5,37,13,3
```

Tells MAP2MIF to use personality code 5 for streets, 37 for railroads, 13 for water, and 3 for boundaries.

These arguments are BDY2MIF arguments:

/NC

Tells BDY2MIF not to check for boundary closure. While this speeds up BDY2MIF, you run the risk of having unclosed boundaries automatically closed in an undefined way when you use this option.

/N:name

specifies the field name for the boundary name field (e.g., ZIP or City).

/NW:name-width

specifies the name field width. By default BDY2MIF determines the longest name in the boundary file, rounds it up to the nearest five, and uses that for the name field width.

Appendix 3 Advanced Geocoding

Before explaining how to improve geocoding performance, we give you a brief explanation of how MapInfo geocodes. We first look at geocoding to street address, which is the most complex case. The same considerations will apply when you are geocoding to regions, such as ZIP Codes or counties. In these cases you will not be dealing with the address number part of the process.

How MapInfo Geocodes

The objective of geocoding is to place point objects into your database. Let us call this table the *target* table. The geographical coordinates from a *source* table, which is a mappable table. To geocode a record:

1. MapInfo has to match an address in the target table with an address in the source table.
2. Get geographic coordinates from the source table and use them to create a point object in the target table.

All of the problems in geocoding occur in the first step, matching addresses in the source and target tables.

Street addresses typically consist of two or three components:

1. Street number
2. Street name
3. Apartment, Suite, Floor, or Room number or some other piece of information. Many addresses do not have this component.

MapInfo has one procedure for dealing with the street number and another procedure for dealing with the street name. MapInfo deals with the third component, if present, as though it were a part of the street name.

Automatic and Interactive Modes

MapInfo has two geocoding modes: automatic and interactive. The process MapInfo uses to match target addresses with source addresses is the same in both modes.

Automatic mode matches addresses based on the choices in the Geocode dialog box. Interactive mode stops at each address that does not meet the geocode parameters and permits the user to assist in the matching process.

In most cases, the best geocoding strategy is to:

1) Have MapInfo geocode in automatic mode.
2) Then have MapInfo geocode in interactive mode to deal with the records MapInfo was unable to handle automatically.

The purpose of this appendix is to develop strategies for improving MapInfo's performance on automatic geocoding, thereby reducing the number of records you must handle interactively.

Exact Match

When MapInfo geocodes it attempts to find an exact match between source and target street names. That means that the addresses must be the same, character for character. However, matching is not sensitive to case; upper and lower case letters are successfully matched with one another. MapInfo does not get an exact match in many cases and can use a file of abbreviation equivalences to improve its "hit rate". Once you understand the various ways in which a match can fail, you are in a better position to understand what you can do to improve things.

The table below illustrates exact matching. The first column contains a street name from a target table and the second column contains the corresponding street name from a source table. The third column says why they do not match. The fourth column indicates whether the particular problem is one which can be corrected through using the abbreviation equivalence file. This table assumes that the addresses are the contents of a single column in a table. While the street number would often be in the same column, we don't indicate street numbers here because they are handled differently than street names.

Target Address	Source Address	Comment	Correctable with Abbreviation File
LaSal St	LaSalle St	"LaSal" is the wrong spelling.	No
La Salle St	LaSalle St	"La Salle" is the wrong spelling.	No
LaSalle Ave	LaSalle St	"Ave" does not match "St".	No
LaSalle Street	LaSalle St	"Street" does not match "St".	Yes
LaSalle Ave	LaSalle Av	"Ave" does not match "Av".	Yes
LaSalle St.	LaSalle St	The target address has a period after "St". That period is not in the source and causes the match to fail.	Yes
LaSalle	LaSalle St	"St" is missing from target.	No
LaSalle St	LaSalle	Target has "St" and source does not.	No
LaSalle St North	LaSalle St	Target has "North," which is not in source.	No
LaSalle St North	LaSalle St N	Target has "North" instead of "N".	Yes
North LaSalle St	N LaSalle St	Target has "North" instead of "N".	Yes
North LaSalle St	LaSalle St	Target has "North," which is not in source.	No
LaSalle St Apt 3	LaSalle St	Target has an apartment number which does not match anything in the source.	Yes
Tenth St	10th St	"Tenth" and "10th" do not match.	Yes
10th Av	Tenth Av	"10th" and "Tenth" do not match.	Yes
Saint John's Lane	St John's Lane	"Saint" and "St" do not match.	Yes

MapInfo's matching process is not case-sensitive; it does not care whether a letter is upper case or lower case. This means that MapInfo treats the following as the same: Main, MAIN, main, maIN.

There are various ways of dealing with these issues. MapInfo has a file of substitute abbreviations which you can use to deal with many of these cases, which will be discussed later.

The Matching Process

Matching Street Names

MapInfo begins by comparing the street address in the target table with the street addresses in the source table. When it finds an exact match, it may be finished or it may have to deal with region information, such as town, county, or ZIP Code area.

When MapInfo cannot match the street name for a particular row, it applies the abbreviation file to the target address. This file consists of pairs of items, such as "STREET ST" and "AVE AV". When MapInfo finds "STREET" in a target address, it changes it into "ST"; similarly it changes "AVE" to "AV". MapInfo doesn't actually change your data in the target table. It substitutes abbreviations only for the purpose of making matches. The substitution is only effective during the matching process. The address in your table remains the same.

Once MapInfo has made an abbreviation substitution it attempts to match the resulting street name against the street names in the source table.

When MapInfo does not find an exact match, it looks for a street number. When it finds a street number, MapInfo ignores it so that it can try to match (i.e "Maple Av" vs. "Maple Av" instead of "10 Maple AV"). MapInfo then tries the first two steps (direct match, match with substitute abbreviations) again. When it fails to find an exact match at this point it:

- Moves to the next row (when it is geocoding in automatic mode).
- Presents you (the user) with the closest matches (when it is geocoding in interactive mode). You then pick the best match. MapInfo then goes to the next row.

At this point MapInfo will have done the best it can at identifying street names. The next step is to deal with address numbers for those addresses where it has matched a name.

Matching Address Numbers

Given that MapInfo has identified a street, it now has to deal with street numbers. MapInfo stores address ranges with each street segment. MapInfo takes the street number from the target address and compares it to the ranges for each segment in the source table. For example, assume that we are trying to match "343 LaSalle St". MapInfo stores the beginning and ending address for each segment, differentiating between left and right sides of the street, as follows:

Name	FromLeft	ToLeft	FromRight	ToRight
LaSalle St	269	331	268	330
LaSalle St	333	375	332	374
LaSalle St	377	401	376	400

To match "343 LaSalle St" MapInfo would scan the address ranges until it finds the one where "343" goes. Since 343 is between 333 and 375, MapInfo will locate this address on that street segment (the middle one in the table).

Once MapInfo has matched an address number to a street segment it moves to the next row. When it fails to match a target street number to an address range on the appropriate street:

- Moves to the next row if it is geocoding in automatic mode.
- Presents you (the user) with the closest matches if it is geocoding in interactive mode. You then pick the best match. MapInfo will then go to the next row.

At this point MapInfo will have done the best it can at locating address numbers. Note that one of the options (on the Geocode Options dialog) is to have MapInfo automatically pick the closest address range in those cases where there is no exact match—Use The Closest Address Number. For example, you might have "412" as an address number, but no range which includes that number. However, there is a range which goes from 346 to 400. Since that is the range closest to 412, that is where MapInfo will geocode 412 if you have chosen this particular option.

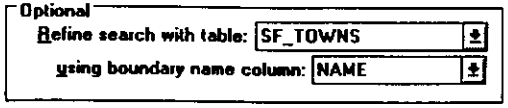
The next step is to deal with addresses which have been located on more than one street.

Matching to Region

When MapInfo is geocoding it checks to see how many occurrences of the target address exist. If there is more than one, MapInfo must decide which source address to use. If the user's target table has a column with region data, MapInfo can refine geocoding within a boundary.

For example, assume that you are geocoding a database of records in Cook county, Illinois. The address in the database reads 200 Washington St. Within the county of Cook, there are eight towns. Four of these towns have a Washington St. Three of the four have a 200 Washington St. MapInfo must now place the target address in the appropriate town. MapInfo uses region information to do this. MapInfo now matches a region designation for the target address against the region designator for the source addresses.

When you originally set-up your geocoding operation, you had an opportunity to specify a region (boundary) to use in refining your geocoding operation:



You could use any one of several different region types, including county name, town name, and ZIP Code. Since almost all addresses contain ZIP Codes, this is the most reliable way to refine your search.

When you set MapInfo to use ZIP Codes to refine its address matching, MapInfo will match the ZIP Code of the target address against the ZIP Code of the various matching source addresses. When it finds the correct match, it is finished with the geocoding process. MapInfo can now get coordinate information from the source table and use it to place a point object into the target table.

However, once MapInfo has completed this process, many addresses may be unmatched. You can match each one of them individually by geocoding in interactive mode. However, if you are working with a large database, you want to do as little of this as possible. There are other ways of improving MapInfo's geocoding performance.

In the Geocode Options dialog, you can specify that MapInfo automatically pick a different boundary, providing there is only one, from the one you specify (Use A Match Found In A Different Boundary). You might have had MapInfo geocode addresses to Northtown. One particular address, "223 Locust Ct." is not in Northtown. But it is in Westville, and no place

else. In this case, MapInfo would geocode "223 Locust Ct. " to Westville. However, if MapInfo had found a "223 Locust Ct."and another one Center Valley, it would not geocode it to either. It would leave "223 Locust Ct." ungeocoded.

Return Codes

When you are using the result code option (on Geocode Options dialog) MapInfo will generate a code for each record. These codes indicate the steps MapInfo took to geocode the record, whether or not the geocoding was successful, and whether or not the match was exact. You can use return codes to diagnose MapInfo's geocoding performance. It will help you spot "false positives" resulting from using various geocoding options and to analyze why some records have not been geocoded. See the section on Result Codes, for information on these codes.

Problems and What to Do About Them

Problems with Abbreviations and Substitutions

Your target table may contain address components which MapInfo cannot handle with its abbreviation file. For example:

Ave.	Does not recognize the period.
Suite	Does not recognize this at all.
WK	Does not recognize this at all.
#	Does not recognize this at all.

You can deal with this problem in two ways:

1.) You can edit addresses in your target table so that it contains items MapInfo can handle.

2.) You can edit MapInfo's abbreviation file so that it can deal with your addresses.

In many cases, the second alternative is easier. MapInfo's abbreviation file (see below) consists of pairs of items. The second item in each line is the abbreviation for the first. In working with street files MapInfo searches through the address file to match an item in a target address with the first element in one of the pairs in the abbreviation file. When it finds a match it replaces the matching items with the proper abbreviation.

MapInfo supplies the following abbreviation file:

```
!Version 2.0

FIRST 1ST
SECOND 2ND
THIRD 3RD
FOURTH 4TH
FIFTH 5TH
SIXTH 6TH
SEVENTH 7TH
```

```
EIGHTH 8TH
NINTH 9TH
TENTH 10TH

NORTH N
SOUTH S
EAST E
WEST W

ALLEY AL
AVENUE AV
AVE AV
BOULEVARD BLVD
BRIDGE BR
CIRCLE CIR
COURT CT
DRIVE DR
EXTENSION EXT
HIGHWAY HWY
INTERSTATE I
LANE LN
MOUNT MT
PARK PK
PARKWAY PKWY
PLACE PL
PLAZA PLZ
POINT PT
RAILROAD RR
ROAD RD
ROUTE RT
SAINT ST
SQUARE SQ
STREET ST
STR ST
TERRACE TER

!EOLNOSPACE
.
:
#
```



```
!EOLSPACE
FLOOR
SUITE
"P.O. BOX"

!NOSPACE
.
\"
\\
\\

!SPACE
"STATE HIGHWAY"STHWY"
"N ST"NORTH ST"
"S ST"SOUTH ST"
"E ST"EAST ST"
"W ST"WEST ST"
"N AV"NORTH AV"
"S AV"SOUTH AV"
"E AV"EAST AV"
"W AV"WEST AV"
```

You can make additions to this file to take care of various problems. Most importantly, you can make several different kinds of additions. MapInfo recognizes four classes of substitution items and it interprets these classes differently. Each class is preceded by the keyword used to identify it in the abbreviation file:

Substitution Class	Keyword
Space-delimited simple substitution	!SPACE
Simple truncation	!EOLNOSPACE
Space-delimited truncation	!EOLSPACE
Simple substitution	!NOSPACE

In order for MapInfo to know how to interpret a line, or set of lines, in the abbreviation file, you have to precede the line with the keyword which indicates the appropriate interpretation strategy.

When all of the entries in the abbreviation file use the default interpretation, there is no need to precede any of them with a keyword. When there is no keyword at the beginning of the abbreviation file, MapInfo will treat the initial entries as requiring the default interpretation. Once you add other types of substitution pairs, however, you have to start adding keywords.

Space-Delimited Simple Substitution

Space-delimited simple substitution is MapInfo's default. What that means is this: MapInfo compares spaced-delimited tokens in target addresses with the rows in the address file. A space-delimited token is a string of characters with a space before and a space after. For example, MapInfo will replace "Ave" with "Av" in "Park Ave" but it will not change "Avery Blvd" to "Avry Blvd." Both street names contain the string "Ave". But that string is bordered by spaces only in "Park Ave", not in "Avery Blvd." In "Avery Blvd", "Ave" is followed by "r", not by a space.

All of the entries in the abbreviation file will receive this default interpretation. You can add other items to receive the same treatment. For example, you might want to add the pair "WK WALK" so that MapInfo knows to interpret "WK" in a target address as though it were "WALK". Similarly, you might want to add a pair such as: "CIRCLE CIR".

Use the keyword "!SPACE" to indicate space-delimited simple substitution. Entries following "!SPACE" are given the default interpretation (this allows you to arrange the Abb.file contents in some other order). When MapInfo encounters another keyword, it switches to the indicated interpretation strategy.

Simple Truncation

In simple truncation, MapInfo finds an item in the address and simply ignores it and everything after it. These items do not have to be space-delimited. This strategy is useful for dealing with addresses such as:

123 Appian Way, Mail Stop 829

7305 Van Zandt # 23

In the first case, you want MapInfo to ignore the comma and everything after it. In the second case you want MapInfo to ignore the number sign and everything after it. To deal with such cases add the following to your abbreviation file:

```
!EOLNOSPACE
,
#
```

"!EOLNOSPACE" is the keyword indicating that the following items are to be treated as cases of simple truncation. After that we have one line with a comma and one with a number sign. Whenever MapInfo encounters a comma or a number sign in an address it will ignore it and everything after. The examples would become:

123 Appian Way

7305 Van Zandt

Space-Delimited Truncation

In space-delimited truncation MapInfo looks for items which are space delimited and eliminates those items and everything following. For example:

73 Appian Way Suite 829

3033 Van Zandt Room 202

To deal with such cases add the following to your abbreviation file:

```
!EOLSPACE
SUITE
ROOM
```


"!EOLSPACE" is the keyword indicating that the following items are to be treated as cases of simple truncation. After that we have one line with "Suite"and one with a "ROOM". Whenever MapInfo encounters those tokens it will truncate the address. The examples would become:

73 Appian Way

3033 Van Zandt

Simple Substitution

MapInfo uses simple substitution to remove items from an address and otherwise does nothing. Use it to deal with:

433 Van-Rensselaer

91 St Albans'

The goal is to strip out the hyphen and the apostrophe. Make the following entries to the abbreviation file:

```
!NOSPACE
-
'
```

"NOSPACE" is the keyword calling for simple substitution, and the hyphen and apostrophe on the following lines are the tokens to be removed. The examples would become:

369 VanRensselaer

91 St Albans

Legitimate Spaces

There are cases where you want to indicate a substitution in which the searched for string contains spaces. You can use double quotes in such cases. Place a double quote:

1. at the beginning of the line,
2. between the searched for string and the substitution, and
3. at the end of the line.

For example, you might want to substitute "STHWY" for "State Highway". To do that, use the following line:

```
"State Highway"STHWY"
```

This provides a solution to a subtle problem, that of street names which match items in the abbreviation file. For example, "North St" and "Park Av" both have initial strings which match terms in the abbreviation file. Consequently, MapInfo will substitute "N" for "North" to yield "N St" and "Pk" for "Park" to yield "Pk Av." You could add the following lines to the Abbreviation file to rectify these substitutions:

```
"N ST"North ST"
"PK AV"PARK AV"
```

Note that these lines have to come *after* the entries which substitute "N" for "North" and "PK" for "Park". If they came before, they would have no effect. Thus:

...

```
...
NORTH  N
...
...
PARK  PK
...
...
"N ST"NORTH ST"
"PK AV"PARK AV"
...
...
```

When MapInfo encounters NORTH N it will turn NORTH ST into N ST. When it encounters "N ST"NORTH ST" it will then turn N ST into NORTH ST. PARK AV is treated similarly.

Special Characters

MapInfo uses the exclamation point (!), the double quote (") and the backslash (\) as special characters. These characters tell MapInfo how to treat strings which follow them, but are not themselves ordinarily treated as characters in substitution strings. The exclamation point tells MapInfo that the string should not be interpreted as an abbreviation. The double quote tells MapInfo that spaces in the string are legitimate. And the backslash tells MapInfo to treat a special character as an ordinary character.

When you want to use any of these in a line where they are to be treated as simple characters, precede them by a backslash. Thus:

```
\!
\"
\\
```

Adding Lines to the Abbreviation File

You can add a new item to the file by adding a new row. The order in which you add rows is not significant, except in those cases where you expect one substitution pair to compensate for the effects of another. The number of spaces between the first and second items in a row is not significant either.

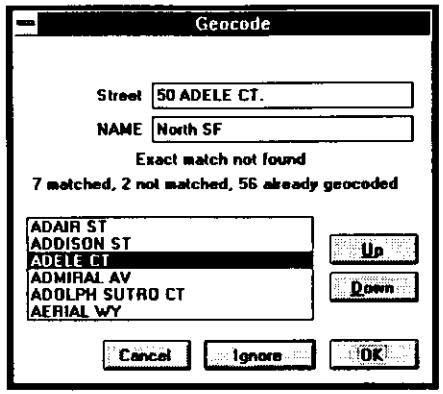
The abbreviation file is a simple ASCII file—MAPINFOW.ABB for Windows, MapInfo.Abbreviation for Macintosh. You can edit it in any text editor or word processor. Open the file and make your additions, adding keywords as necessary.

Spelling Errors in Street Names

When your target table has an address name spelled differently than the source table, MapInfo cannot make a match. There are three possibilities to consider:

1. Geocode interactively.

When you are geocoding interactively, MapInfo displays a dialog that lists close alternatives.



Use the Up and Down keys to scroll through the list and choose a street.

2. Edit the target table.

When you think there are too many errors in your target table, you can edit the target table before geocoding it. MapInfo's Update Column function is useful for editing tables.

However, it is possible that the street is spelled incorrectly in the source table.

3. Edit the street name in the source table.

Alternate Street Names, Street Name has Changed

Some streets may be known by two different names. MapInfo's StreetInfo table will have only one of these names. But addresses in your table may use the name which is not in MapInfo's table.

A similar situation arises when a street name changes. Your map will reflect the old name and so will not match addresses which employ the new name. You can edit the map to reflect the name change, but then it will not reflect addresses using the old name. You really want to be able to match addresses using both the old and new names.

You can deal with the problem by adding another row to the file of street names, as follows:

1. Open the filename2.TAB file—the street name file of your street map (not the segment file).
2. Find the row with the street name you want an alternate for and note its MI_REFNUM value.
3. Add a new row with the alternate name AND the same MI_REFNUM as the primary name.
4. Save and close the file.

MapInfo will now recognize both names in addresses being geocoded.

Incorrect Address Ranges

When a target record has an address which is not in any of the ranges in the source table, MapInfo will not be able to match it. Such an address might fall into a gap in range numbers or it might be beyond the ends of the ranges. There are three possibilities for handling this problem:

1. You can enable the option to Use The Closest Address Number in the Geocode Options dialog. MapInfo will then geocode unmatched address numbers to the closest existing range, placing the record at the center of that range.
2. You can deal with such cases in Interactive mode. MapInfo will give you a list of known address ranges. Select the closest address range from the list or click on Ignore to ignore the record.
3. It is possible, however, that the address is for a street segment which was added after your source map was made. In that case, you may want to edit the source map so that it reflects the full range of addresses for that street.

Post Office Boxes

StreetInfo tables do not contain Post Office boxes. When your database contains Post Office boxes, you will not be able to geocode them to a StreetInfo table. You have to geocode these records in a different way.

For example, if you know that a table contains many addresses with Post Office boxes, you could first select all the rows containing Post Office boxes and geocode those rows to ZIP Code. Then you can geocode the remaining records to street address.

To find all the addresses containing Post Office Box numbers you need to have some way of identifying them. One plausible indicator is the word "box". Use MapInfo's InString$ function to select all records containing the substring " Box ". Note the spaces on either side of "box". By telling MapInfo that we want those spaces, we make sure we will not include, for example, addresses on Boxwood Street. Using either Select or SQL Select, you want all records which meet this test:

```
InString$(1,ADDRESS," BOX ")>0
```

The number "1" tells MapInfo to search address entries starting with the first character. "ADDRESS" is the column containing the street address. " BOX " is the substring MapInfo is searching for. When MapInfo finds " BOX " in an address, it returns a number indicating the position of the first character of " BOX " in the address. It follows that, for any record where the value of Instring$ is greater than zero, that address contains " Box ".

You can now geocode this Selection to ZIP Code. That will take care of those records. Then you can geocode the whole database to addresses. Since those with Post Office boxes have already been geocoded, MapInfo will skip over them.

Inaccurate Town Names

MapInfo's last geocoding step is to determine in which region to place a matched street address. MapInfo only takes this step if you have so specified when you set-up the geocoding process. It is common to use town or city name as the refining boundary. This causes problems because people often do not use the town name which the Census Bureau assigns to their address. Since almost all electronic maps of the United States are based on Census Bureau maps, this will cause problems.

For example, the address "50 Wolf Rd., Albany, NY" is actually in the town of Colonie. Thus the address town name in the target address will not match the appropriate town in the source file against which it is being geocoded.

One way to deal with this problem is to enable the Try Searching In A Different Boundary option on the Geocode Options dialog. When this option is enabled, MapInfo will geocode an address to whatever boundary that address is in, providing that address is in only one boundary. When the address is in more than one boundary, the geocoding will fail.

Another way to deal with this problem is to use the ZIP Code as the refining boundary, rather than the town or city name.

Using Result Codes

You can now specify a numeric field (Geocode Options dialog) in which MapInfo will write a code indicating which steps were taken to geocode the record or why the record did not match. These codes can be very useful in catch "false positive" matches and in improving the "hit" rate by diagnosing problems and correcting them.

The return code is a eight-digit number, with each digit indicating a particular aspect of the geocoding operation. MapInfo "scores" each record on each aspect and adds the three numbers together to get the result code for that record. For example, a result code of 122 means:

1. The address was found in one other boundary: 100
2. The exact address range was not found: 20
3. Abbreviation file substitutions were made: 2

The tables below indicate the significance of each element in the code.

General	
<0	Not matched
0	Not tried
1	Exact match
>1	Inexact match

The return codes have been designed so that non-matches will have a negative value and matches will have a positive value. A record which has not been tried will have a return code of zero.

Street Name Codes	
1	Exact match found
2	Abbreviation file applied
3 (-)	Exact match not found
4 (-)	No street specified
5	User picked a name from the list

Codes indicating how MapInfo has treated street names appear in the one's place of the result code.

Address-Range Codes	
000	Exact address range and side of street found
10	Address range found, but could not determine side of street
20 (+/-)	Address range not found, but within minimum and maximum ranges
30 (+/-)	Address range not found, but beyond minimum and maximum ranges
40 (+/-)	Address range not specified, but matched to minimum range
50 (-)	Streets do not intersect
70	User picked an address from the list

Codes indicating how MapInfo has treated address ranges appear in the ten's place of the result code.

Refining-Boundary Codes	
100 (+/-)	Address range found in only one boundary other than specified boundary
200 (-)	Address range found in more than one boundary other than specified boundary
300 (+/-)	No boundary specified, but found in only one
400 (-)	No boundary specified, and found in more than one
500	Exact street address found more than once in the specified boundary
600	User picked a boundary from the list
1000000 (+/-)	User typed something new

Codes indicating how MapInfo has treated refining boundaries appear in the hundred's place of the result code.

Once you have result codes, you need to find out how your records were handled. You can use the following SQL Select statement to find out which result codes appeared in your table and how many records were returned with each code value:

Select columns:	**Result_Code, count(*)**
from tables	**SomeData**
group by columns	**Result_Code**

The resulting query table will have a row for each different three-digit result code and a count of how many records had that code. You can then use Select or SQL Select to select all the records with a particular code. You can then browse these various selections and determine how to handle each class of records.

Examples of Codes

675 User pick street name, address range, and boundary.

101 Exact match found in exactly one boundary other than boundary specified.

Appendix 4 Converting Coordinates

You can enter longitude and latitude coordinate values for points directly into your database. When you do this, you must enter the coordinates in decimal degrees; MapInfo does not recognize coordinates entered in degrees, minutes, and seconds. Point coordinates entered in degrees, minutes, and seconds appear in incorrect locations on your map.

Degrees, Minutes, and Seconds Converted to Decimal Degrees

All it takes is some division to obtain the decimal form from a coordinate that is written in degrees, minutes, and seconds. The formula to use is:

$$\text{Decimal Degrees} = \text{Degrees} + \frac{\left(\text{Minutes} + \frac{\text{Seconds}}{60}\right)}{60}$$

For example, to convert 42 degrees 45' 30" to decimal degrees:

$$\text{DECIMAL DEGREES} = 42 + \frac{\left(45 + \frac{30}{60}\right)}{60}$$

$$= 42 + \frac{(45.5)}{60}$$

$$= 42.7583333$$

The number 42.7583333 is the decimal degree equivalent of the original number that was in degrees, minutes, and seconds.

Decimal Degrees to Degrees, Minutes, Seconds

This is best explained with an example. To obtain degrees, first take the whole number from the coordinate. For, 75.213458 decimal degrees:

DEGREES = 75

To obtain minutes:

MINUTES = (0.213458 * 60)

(Where .213458 is the decimal part of the entire decimal degree coordinate)

= (12.807480)

MINUTES = 12

To obtain seconds:

SECONDS = (0.807480 * 60)

(Where .807480 is the decimal part of the immediately previous calculation)

= (48.4488)

(You can keep decimal digits, such as 48.45 seconds)

The final result:
75.213458 = 75 degrees 12' 48"

Appendix 5 Creating Expressions

Formulating expressions is something like writing sentences. There is a vocabulary of words from which you can draw from and these words have to be combined according to syntactic rules. The syntax of expressions is much simpler than the syntax of English, and the vocabulary is vastly smaller. However, most of us have been using English for years and so it seems easy and natural whereas formulating expressions is, at first, sometimes a bit difficult.

However, just as English has simple sentences and complex sentences, so there are simple expressions and complex ones. Even if you don't get the hang of formulating complex expressions, you can still use all the MapInfo commands that use expressions. That is because formulating simple expressions is very easy and, at the same time, allows you to work with your data in powerful ways.

Constructing Expressions

Simple Expressions

You formulate expressions using columns (or field) names and constants (i.e. specific data values), on the one hand, and functions and operators, on the other. Think of the column names and constants as nouns, and functions and operators as verbs, prepositions and conjunctions. You always need at least one column name or a constant in an expression. How many operators and functions you need depends on what you want to do with your expression.

The simplest possible expression consists of a column name, for example:

1. `POP_1990`
2. `STATE`

You could use such an expression in Shade by Value to indicate what data is to be represented on the map. In Update Column such an expression would tell MapInfo what data to use in updating a column in the target table.

Here are some slightly more complex expressions:

3. `POP_1990 > 17893`
4. `POP_1990 <= POP_1980`
5. `COUNTY <> "Orange"`
6. `POP_1980 * 1.2`
7. `POP_1990 / AREA`
8. `round(POP_1990/AREA,.1)`

The first three examples use comparison operators. The first tests to see whether the 1990 population is greater than (>) some constant (17893). The second tests to see whether the value of one column, POP_1990, is less than or equal to (<=) the value of another column, POP_1980. The third tests to see whether or not the county is Orange. When the county does not equal (<>) "Orange" the record is selected. You could use any of these expressions in

Select or in the Where Condition clause of SQL Select. These commands allow you to select a subset of the records in a table. The expression defines the characteristics of the subset.

Examples 6 and 7 use arithmetic operators. Example 6 multiplies (*) the value of POP_1980 by a constant (1.2) while example 7 divides one column, POP_1990, by the value of another column, AREA.

Example 8 uses the round function to round the value of the expression "POP_1990/AREA" to the nearest tenth (.1).

Expressions 6, 7 and 8 don't have comparison operators and therefore they would not suitable for use in Select or in the Where Condition clause of SQL Select. However, you could use them alone in Shade by Value, Update Column, or Select columns in SQL Select.

Complex Expressions

Now consider examples 9 and 10, that are a bit more complex than 1 through 8:

9. `POP_1990 > POP_1980*1.2`
10. `round((POP_1980*1.2)/AREA,.1)`

We created expression 9 by taking expression 3 and replacing the constant "17893" with the whole of expression 6. Similarly, we created expression 10 by taking expression 8 and replacing "POP_1990" with expression 6.

In general, you create complex expressions by combining simple expressions. Perhaps the best way to learn how to do this is look at some of the examples we have provided (above and following) and create your own expressions based on those examples. However, there are two very general techniques for creating complex expressions.

- Replace a column name or a specific value with a simple expression.
- Combine expressions using logical operators (and, not, or).

Example six illustrates the first technique. There are many examples of the second technique throughout this entry. See particularly the discussion beginning on page 338.

Entering Specific Values (Constants)

When entering specific character strings, numbers, and dates, into expressions you need to follow certain conventions.

Character Strings

When typing a particular string into an expression, you should enclose it in double quotes so that MapInfo knows to treat it as a string, rather than treating it as a column name. 11 and 12 are valid string constants while 13 and 14 are not.

11. `"Orange"`
12. `"New York"`
13. `Orange`
14. `New York`

Numbers

When entering specific numerical values, do not use commas or dollar signs or any characters other than numerals and the minus sign for negative numbers.

Dates

Dates consist of a month, a day, and an optional year. The year is specified by two or four digits and should be enclosed in double quotes. The components of a date can be separated by hyphens or slashes. The following are valid data constants:

15. `"1-20-92"`
16. `"01/20/1992"`
17. `"1/20"`

Operators

Mathematical operators:

+	plus	A + B
-	minus	A - B (subtraction) -A (negative)
*	times	A * B
/	divided by	A / B
^	exponentiation	A ^ B

Note that you can:

- Add numbers to dates to yield another date,
- Subtract a number from a date to yield another date,
- Subtract a date from a date to yield a number.

When you add numbers to dates, or subtract numbers from dates, MapInfo treats the numbers as specifying a number of days. If you want to add or subtract a week, you would use the number 7. When you want to add or subtract a month, you could use 30 or 31. When MapInfo subtracts a date from a date, the resulting number indicates a number of days.

String operator:

+	"concatenation" —connects strings and string expressions.

Strings must be enclosed in double quotes. Consider the following example:

```
"Ms." + Last_Name
```

When MapInfo evaluates this as part of an expression it places "Ms. " in front of each last name. Note that the string constant ("Ms. ") is in quotes. Similarly,

```
"Hello, " + "world"
```

gives you "Hello, world." And

```
"4"+"5"
```

gives you "45."

Comparison operators:

=	"equals"
<>	"not equals"
>	"greater than"
<	"less than"
>=	"greater than or equal to"
<=	"less than or equal to"

Numerical Comparison

Numerical comparisons are based on the numerical values of the expressions and numerical constants.

English: All where the household income is above $65,000.

18. `HH_INC>65000`

Comment: Don't add the dollar sign or comma. MapInfo doesn't know what to do with it and gives you an error message.

English: All where the median age is 42.

19. `MED_AGE=42`

Comment: This expression selects only those records where the median age is exactly 42. When your median age data contains a decimal portion (which is the case for MapInfo-supplied demographic data) then it is unlikely that there are many regions with a median age of exactly 42.

The following expression gives you better results:

20. `Round(MED_AGE, 1)=42`

Comment: The function "round(*somenumber, somenumber*)", rounds the first number in the way specified by the second. In this example, the first number is the median age (MED_AGE) and the second is 1, indicating that median age is to be rounded to the nearest whole number.

English: All where the amount does not equal $23,000.

21. `AMOUNT<>23000`

Comment: You might want to use the Round function, as in 10, if you are not concerned that the value be exactly 23000.

String Comparison

String comparisons are based on the exact character content of the string. In this case ">" means "alphabetically greater than" (i.e. comes after in the alphabet) and "<" means "alphabetically less than." *String comparison is case sensitive*, that is, MapInfo does distinguish between upper and lower case letters.

When typing a string into an expression, you should enclose it in quotes so that MapInfo knows to treat it as a string, rather than treating it as a column name.

English: All the where the vendor is Acme.

22. `VENDOR="Acme"`

Comment: Note that Acme is in quotes so that MapInfo knows to treat it literally (as a character string) rather than to search for a column named Acme.

English: All the where the vendor is not Acme.

23. `VENDOR<>"Acme"`

Date Comparison

English: All received on October 9, 1991.

24. `RECEIVED="10-9-91"`

Comments: Note several things:

- The date is enclosed in quotes.
- It is in the form: Month, Day, Year.
- The numbers in the data are separated by hyphens. You can also use a slash (/).
- Two characters were used for the year. You can also use four characters (1991).

English: All received after October 9, 1991.

25. `RECEIVED>"10-9-91"`

Comment: This expression does not select those received on October 9, 1991. When you want them as well:

(20) `RECEIVED>="10-9-91"`

English: Records for all received before August

26. `Month(RECEIVED)<8`

Comment: This expression uses the Month function to extract the month in the date. It doesn't specify any particular year. When your database has records for several years, this expression does pay attention to the particular year.

Logical Comparison

English: All that have shipped.

27. `Shipped`

Comment: The column "Shipped" is a logical column. It contains "T" for true, or yes, and "F" for false, or no. When an order is shipped, it is marked "T". Otherwise, it is not shipped. For orders that are shipped, expression 27 evaluates to true. For orders not shipped it evaluates to false.

English: All that have not shipped.

28. `Shipped="F"`

29. `Not Shipped`

Geographic operators

MapInfo has several geographic operators. Use them to select objects on the basis of their spatial relationship to some other object. MapInfo has a special keyword you use with geographical operators: "obj" or "object". This keyword tells MapInfo that it has to get values based on the graphical objects in the table rather than the tabular data.

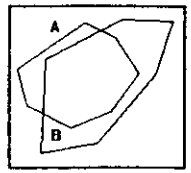
The geographic operators go between the objects being specified. Select the geographic operators from the Operators menu.

Here are the geographic operators:

Contains	Object A Contains object B if B's centroid is anywhere within A's boundary.
Contains Entire	Object A Contains Entire object B if B's boundary is entirely within A's boundary.
Contains Part	Object A Contains Part object B if B's boundary is partly within A's boundary.
Within	Object A is Within object B if its centroid is inside B's boundary.
Entirely Within	Object A is Entirely Within object B if A's boundary is entirely within B's boundary.
Partly Within	Object A is Partly Within object B if A's boundary is partly within B's boundary.
Intersects	Object A Intersects object B if they have at least one point in common.

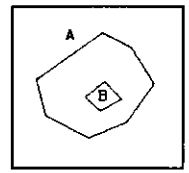
The difference between Contains and Within on the one hand, and Contains Entire and Entirely Within on the other, hinges on the fact that Contains and Within are based on object

centroids while Contains Entirely and Entirely Within are based on the whole object. The following graphic illustrates this point:



objectA CONTAINS objectB

objectB WITHIN objectA



objectA CONTAINS ENTIRE objectB

objectB ENTIRELY WITHIN objectA

objectA INTERSECTS objectB

objectB INTERSECTS objectA

In each case object A contains object B because the centroid of object B is inside the boundary of object A. However, in the cases at the left and in the middle, part of object B is outside the boundary of object A. Only in the case to the right is all of object B inside object A. Only in this case could we assert "object A Contains Entire object B" or "object B Entirely Within object A". Further, if A contains entire B, the A contains B and If A is entirely within B then A is within B.

Note, however, that MapInfo can perform a simple Contains or Within comparison more rapidly than a Contains Entire or Entirely Within. Therefore, unless you must be absolutely sure that objects are completely inside other objects you should use Contains and Within rather than Contains Entire or Entirely Within.

Intersect is the only geographical operator you are likely to use in a simple Select statement. That is because Contains, Contains Entire, Within, and Entirely Within generally involve two sets of objects, that are most likely in two different tables. These operators are most appropriately used in the Where Condition of SQL Select. Intersect, however, can work with a single set of objects, such as a table of regions or street segments.

Logical operators:

and	is "true" if (and only if) both of its arguments (the expressions it joins together) are true. A record must satisfy both of these conditions if it is to be selected.
or	is "true" if either one, or both, of its arguments (the expressions it joins together) are true. A record need satisfy only one of these conditions if it is to be selected. It is also selected if both of its conditions are satisfied.
not	is "true" if its argument (the expression it applies to) is false. A record is selected if it does not meet the stated condition.

"And", "or", and "not" are logical operators. You use them to combine expressions in Select and the Where Condition clause of SQL Select. MapInfo treats each such expression as a test which it applies to each record in the table. For each test it gets a yes/no (true/false) answer. MapInfo uses the logical operators to tell it how to combine the individual yes/no answers into an overall yes/no answer: Does the current record meet the selection condition?

Suppose you want to select all properties that are worth $250,000 or more and are in Columbia county. Each record has to meet two criteria, each of which requires formulation in a simple expression:

```
30. VALUE >= 250000
31. COUNTY = "Columbia"
```

You could perform one selection for all properties worth $250,000 or more. Then you could perform another selection on that result, looking for all properties in Columbia county. However, it is easier to combine the two operations into one using the logical operator "and".

```
32. COUNTY = "Columbia" and VALUE >= 250000
```

When MapInfo examines a record to see whether or not it meets the condition set by this expression, it makes the two tests: Does COUNTY equal Columbia? Is the VALUE equal to or greater than 250000? When the answer to both of these questions is true (or yes), then the record is accepted into the current selection. When the answer to one or both of the questions is no (or false), then the record is not accepted into the current selection.

Now, what if you want all properties worth $250,000 or more and not in Columbia county? You can use "not" to negate the first clause of expression 32, yielding expression 33:

```
33. not (COUNTY="Columbia") and VALUE>=250000
```

Only records where the county is not Columbia satisfies the first clause of expression 33. Now consider expression 34:

```
34. not (COUNTY="Columbia" and VALUE>=250000)
```

Expression 34 is simply the negation of expression 32. Any record that would satisfy 32 does not satisfy 34. Any record that does not satisfy 32 satisfies 34.

You can use "or" when you want to specify alternative conditions, such as:


```
35. COUNTY="Columbia" or COUNTY="Greene"
```

Any record evaluated against this condition is accepted if its county is any one of the two specified counties. One could, of course, use numerical tests as well. For example:

```
36. AREA>40 or VALUE>250000
```

This tests to see whether the area is greater than 40 or the value is greater than 250000. When either one is true of a record, then that record is accepted into the selection.

In formulating expressions using logical operators you have to be careful how you use them. The following expression, while it seems OK, does not work:

```
37. COUNTY="Columbia"or"Greene"
```

Judging from its English translation—COUNTY equals Columbia or Greene—this expression should operate just like expression 35 and give us any record containing Columbia county or Greene County. But the rules of computational logic and the rules of English are a bit different.

When MapInfo reads expressions it reads them from left to right. One of the things it has to do is to determine how the items in the expression are grouped. Think of this operation as inserting parentheses into the expression. MapInfo reads expression 35 as though it were grouped like expression 38 (below) which is what we intend. It reads expression 37 as through it were grouped like 39(below) which is not at all what we want.

```
38. (COUNTY="Columbia") or (COUNTY="Greene")
38. (COUNTY="Columbia") or ("Greene")
```

Both 38 and 39 have the same first clause. But their second clauses (after the "or") are quite different. The second clause of 39 is simply a literal string, "Greene." By convention, MapInfo evaluates a record against a literal string as being true if that record is not blank. When MapInfo evaluates records against expression 39, all non-blank records are evaluated as true and be accepted into the selection. It does not make any difference how a record evaluates on the first clause. Any non-blank record evaluates true on the second clause, and one "true" is all it takes to evaluate the entire expression as true.

Let us consider one final example, which is the negation of expression 35:

```
39. not (COUNTY="Greene" or COUNTY="Columbia")
```

Expression 38 is satisfied if the county is Greene or if it is Columbia, but not if it is Montgomery or Warren. Expression 40 is satisfied by any county other than Greene or Columbia, including Montogomery and Warren.

Numeric Clauses

English: All the household income is above $65,000 and the median age is 42.

40. `HH_INC>=65000 and Round(MED_AGE, 1)=42`

Comment: This expression simply consists of two clauses. The clauses are connected by "and", that means that both clauses must be true of a record for it to be selected.

English: All with a price between $50,000 and $100,000.

41. `PRICE>=50000 and PRICE<=100000`

Comment: Now we are setting two conditions that a record must satisfy in order to be selected. By using the operators "greater than or equal to" (>=) and "less than or equal to" (<=) we insure that the records with the exact prices of $50,000 and $100,000 are selected. When we had simply used "greater than" (>) and "less than" (<), the expression would select $50,001 and $99,999 but not $50,000 or $100,000.

English: All with a price between $50,000 and $100,000 or between $150,000 and $200,000.

42. `(PRICE>=50000 and PRICE<=100000) or (PRICE>=150000 and PRICE<=200000)`

Comment: This expression has the overall form: (*expression1*) or (*expression2*). Each of these expressions has the same form as expression 45. When a row meets the condition specified by either *expression1* or *expression2*, MapInfo puts the row into the selection.

String Clauses

English: All customers from N to Q.

43. `LAST_NAME >= "N" and LAST_NAME <"R"`

Comment: The first part of the expression checks for names that are either alphabetically equal to "n" or that are alphabetically greater than (after) "n". The second part of the expression checks for names that are alphabetically less than (before) "r". Any name starting with letters "n" through "q" satisfies this condition.

English: All customers from N to Z.

44. `LAST_NAME >= "N"`

Comment: Since "z" is the last letter in the alphabet, there is no need to test for it. There cannot be any customers with a last name starting with some letter beyond "z".

English: All customers whose last name begins with C.

45. `LAST_NAME>="C" and LAST_NAME<"D"`

Comment: The logic of this expression is the same as the logic for expression 47.

English: All customers whose last name is between "Ce . . ." and "Cn . . ."

46. `LAST_NAME=>"CE" and LAST_NAME<"CO"`

Comment: The logic of this expression is the same as the logic for expression 45.

English: All not from Texas.

47. `not STATE="TX"`

Comment: The expression causes MapInfo to check the contents of the STATE column. When there is an entry other than "TX" the row is selected.

Date Clauses

English: Records for all received in August 1990

48. `Month(RECEIVED)=8 and Year(RECEIVED)=1990`

Comment: In this expression we specify the year explicitly, using the "year(<somecolumn>)" function to extract it from the date.

49. `RECEIVED>="8-1-90" and RECEIVED<="8-31-90"`

Comment: In this expression we don't explicitly ask for month and year. Instead, we rethink a bit and use an expression that might more accurately be rendered in English as: Records for all received on or after August 1, 1990 and on or before August 31, 1990. The two expressions give equivalent results, but they are formulated differently.

English: Records for all received in July or September

50. `Month(RECEIVED)=7 or Month(RECEIVED)=9`

Comment: As in a previous example, no year for the dates. Depending on the data in your table and what you're trying to achieve, that may or may not be a problem. When you want to specify the year:

English: Records for all received in July or September of 1989

51. `month(RECEIVED)=any(7, 9) and year(RECEIVED)=89`

Comment: The first clause of this expression uses the keyword "any", discussed below. The first clause is satisfied if any of the items in parenthesis are true—in this case, the months of July and September.

Keywords

MapInfo supports the use of keywords "any", "all", "in" and "between". These keywords must be typed into expressions.

Use "any" to select any item in a set of items.

52. ABBR = any("AL", "MN", "TX")

Expression 53 is true of any record where the state is Alabama, Minnesota, or Texas.
To understand the use of "all" consider expression 54:

53. ABBR <> all("AL", "MN", "TX")

This statement says: Give me all orders where the state does not equal Alabama, Minnesota, or Texas. It selects all orders *except* those from Alabama, Minnesota or Texas. Consider what would happen if we issued 55:

54. ABBR <> any("AL", "MN", "TX")

Orders from Alabama would be selected because they are not from either Minnesota or Texas; and orders from Minnesota and Texas would be selected for a similar reason.
This example, shows the use of "in":

55. ABBR in("AL", "MN", "TX")

This produces the same result as 53.

Note that "in" is equivalent to "=any" and "not in" is equivalent to "<>all".

Finally, consider 57 and 58, which illustrate "between":

56. PRICE between 50000 and 100000

57. (PRICE between 50000 and 100000) or (PRICE between 150000 and 200000)

These are equivalent to expressions 42 and 43 respectively. You can also use between with character strings (such as are in examples 47, 49, and 50).

Operator Precedence

When MapInfo evaluates expressions it needs to know which components of an expression to evaluate first. This is called precedence. By convention, certain operators are assigned different levels of precedence. Those with the highest level are evaluated first. The following table lists MapInfo's operators in the order in which they are evaluated. Operators at the same level of precedence are evaluated from left to right. Exponentiation evaluates from the right. This affects expressions with multiple exponents: 2 ^ -3 ^ -4 = 2 ^ (- (3 ^ (-4)))

Highest Priority:	parenthesis
	exponentiation
	negation
	multiplication, division
	addition, subtraction
	geographic operators
	comparison operators
	Not
	And
Lowest Priority:	Or

For example, the expression 3+4*2 produces a result of 11. That is because multiplication has a higher precedence than addition and is performed first, in effect:

3+4*2=
3+8=
11

We can add parenthesis to force MapInfo to do the addition first:

(3+4)*2=
7*2=
14

Now consider expression 60, which is intended to select all records July or September of 1989.

58. year(RECEIVED)=89 and month(RECEIVED)=7 or month(RECEIVED)=9

Because "and" has higher precedence than "or", MapInfo treats this expression as though "year(RECEIVED)=89 and month(RECEIVED)=7" was enclosed in parentheses.

59. (year(RECEIVED)=89 and month(RECEIVED)=7) or month(RECEIVED)=9

In this case, any record for July of 89 or for September of any year would be selected. That's probably not what you want. However, by adding parentheses to the second expression, you can get what you want:

60. year(RECEIVED)=89 and (month(RECEIVED)=7 or month(RECEIVED)=9)

In this expression, the parentheses tell MapInfo that "month(RECEIVED)=7" and "month(RECEIVED)=9" are alternatives in the second clause of the expression. MapInfo treats this the same as it treats number 21 above.

Note: When you are not sure how MapInfo evaluates an expression with several operators, you should use parentheses to group elements as you want them.

Functions

Functions take data values and perform some operation on them to produce a new value. Functions have the following form:

SomeFunction(parameters)

Most of MapInfo's functions take one or two parameters. A parameter can be a column or it can be another expression.

MapInfo uses the keyword "obj" or "object" with the geographic functions: Area, CentroidX, CentroidY, ObjectLen, Perimeter. This keyword tells MapInfo that it has to get values based on the graphical objects in the table rather than the tabular data.

Abs

Syntax: Abs(*num_exper*)

Action: Returns the absolute value of a numerical expression. When the expression has a value greater than zero, Abs returns that value. When the expression has a value less than zero, Abs returns a value equal to the value of the expression multiplied by negative one.

Example: Consider the following expression:

61. `Abs (numA-numB)`

The following table illustrates how Abs works:

numA	numB	numA-numB	Abs(numA-numB)
57	23	24	24
57	75	-22	22
57	57.002	-.002	.002

Area

Syntax: Area(obj, *units*)

Action: Returns the area of the object. 0 is returned if the object has no area or there is no object for the record. Arcs, text, points, lines, and polylines do not have areas.

When you choose Area from a menu the "obj" keyword is placed between the parentheses along with the current unit in double-quotes. In most cases the current unit is square miles. When you want area to be in some other unit, you should type the unit in, between quotes.

The units available are:

Unit name	Unit represented
"sq mi"	square miles
"sq km"	square kilometers
"sq in"	square inches
"sq ft"	square feet
"sq survey ft"	square survey feet
"sq yd"	square yards
"sq mm"	square millimeters
Unit name	**Unit represented**
"sq cm"	square centimeters
"sq m"	square meters
"acre"	acres
"hectare"	hectares

Examples: To select all rows for objects that have an area greater that 59 square miles:

62. `Area(obj,"sq mi")>59`

To select all rows for objects with a population density less than 250 people per unit area:

63. `Population/Area(obj,"sq mi")<250`

To calculate the population density of an object:

64. `Population/Area(obj,"sq mi")`

When you want the area in hectares:

65. `Area(obj,"hectare")`

When you want the area in square kilometers:

66. `Area(obj,"sq km")`

CentroidX

Syntax: CentroidX(object)

Action: Returns the x coordinate of the centroid of the object, which is the longitude value for earth maps. The centroid is the center of the object's minimum bounding rectangle (MBR). For an area like Florida, the center of the MBR is not in the region itself.

The value is in decimal degrees if the coordinates are latitudes and longitudes. The value is in whatever units were specified for the table if its coordinates are not latitudes and longitudes.

Examples: To select all objects west of New York City, that are located at -73.997890 longitude and 40.750450 latitude:

67. `CentroidX(obj)<-73.997890`

To select all objects east of New York City, that is located at -73.997890 longitude and 40.750450 latitude:

(68.) `CentroidX(obj)>-73.997890`

To select all objects northeast of New York City:

(69.) `CentroidX(obj)>-73.997890 and CentroidY(obj)>40.750450`

The first clause in the expression selects objects east of New York City while the second clause in the expression selects objects north of New York City. Because the two clauses are joined by "and" an object must satisfy both clauses to be selected.

To select all objects that are either north or east of New York City:

70. `CentroidX(obj)>-73.997890 or CentroidY(obj)>40.750450`

The first clause in the expression selects objects east of New York City while the second clause in the expression selects objects north of New York City. Because the two clauses are joined by "or" an object needs to satisfy only one of them in order to be selected.

CentroidY

Syntax: CentroidY(object)

Action: Returns the y centroid of the object, which is the latitude value for earth maps.

The value is in decimal degrees if the coordinates are latitudes and longitudes. The value is in whatever units were specified for the table if its coordinates are not latitudes and longitudes.

Examples: To select all objects north of New York City, that are located at -73.997890 longitude and 40.750450 latitude:

71. `CentroidY(obj)>40.750450`

To select all objects south of New York City, that are located at -73.997890 longitude and 40.750450 latitude:

72. `CentroidY(obj)<40.750450`

For other examples, see 8 and 9 in the entry for CentroidX above.

Chr$

Syntax: Chr$(*num_expr*)

Action: Chr$ interprets the value of *num_expr* as an ANSI value. It returns the ANSI character corresponding to that value. Accordingly, *num_expr* should be an integer between 0 and 255.

Example: You might want to have labels with information on two lines. You can use Chr$ to insert a carriage return into a label expression (Layer Settings). The ANSI value for a carriage return is 13. Assume that you want the first line of a label to be a country name and the second line of a label to be the county population. The following expression produces that result:

73. `Proper$(County)+Chr$(13)+Population`

Cos

Syntax: Cos(*num_expr*)

Action: The Cos function returns the cosine of the value of a numeric expression, where that expression represents an angle expressed in radians.

CurDate

Syntax: CurDate()

Action: Returns a date value representing the current date.

Examples: To enter the current date into a column:

74. `CurDate()`

You might use this in conjunction with Update Column where you want to enter the current date into some column.

To select all received 30 or more days ago:

(75.) `Received<=CurDate()-30`

Day

Syntax: Day(*datefield*)

Action: Returns the day of the month from the date. The day is represented as an integer from one (1) to thirty-one (31).

Examples: To select all rows where the date is the first of the month:

76. `Day(date)=1`

To select all rows where the day is Friday and the date is not the thirteenth:

77. `Weekday(date)=6 and Day(date)<>13`

This expression has two clauses. The first clause uses the Weekday function to select records where the day of the week is a Friday. The second clauses uses the Day function to select records where the day of the month does not equal (<>) 13. Since the two clauses are connected by "and" both clauses must be true for a row to be selected.

Distance

Syntax: Distance(*x1, y1, x2, y2, units*)

x1 and *y1* are East-West (Longitude) coordinates for earth maps
x2 and *y2* are North-South (Latitude) coordinates for earth maps
units is the current distance unit

Action: Calculates the distance between two points.

When you choose Distance from a menu the "obj" keyword is placed between the parentheses along with the current unit in double-quotes. In most cases the current unit is miles. When you want distance to be in some other unit, you should type the unit in, between quotes. The units available are:

Unit Name	Unit Represented
"mi"	miles
"km"	kilometers
"in"	inches
"ft"	feet
"survey ft"	survey feet
"yd"	yards
"mm"	millimeters
"cm"	centimeters
Unit Name	**Unit Represented**
"m"	meters
"nmi"	nautical miles (1 nautical mile represents 1852 meters)

Examples: To calculate the distance between some objects and New York City, that are located at -73.997890 longitude and 40.750450 latitude:

78. `Distance(-73.997890, 40.750450, CentroidX(obj), CentroidY(obj),"mi")`

To select all objects west of New York and not more than 20 miles from it:

79. `CentroidX(obj)<-73.997890 and Distance(-73.997890, 40.750450, CentroidX(obj), CentroidY(obj),"mi")<=20`

This expression has two clauses. The first clause specifies that an object must be west of New York to be selected. The second clause specifies that an object must be no more than twenty miles from New York in order to be selected. Since the two clauses are connected by "and" both must be true if an object is to be selected.

Format$

Syntax: Format$ (*num_expr* , *pattern*)

num_expr is a numeric expression
pattern is a string that specifies how to format the results

Action: Produces a string representation of the numeric value *num_expr*.

Examples: The Format$( ) function produces a specially-formatted character string, that incorporates a numeric value (specified by the *value* parameter). The Format$( ) function can embed a variety of formatting characters (e.g. currency symbols such as $, %, periods, and commas), to make the result string more readable or more aesthetically pleasing. Given a numeric value such as 12345.67 , your program can use the Format$( ) function to produce formatted results, such as $12,345.67 .

The Format$( ) function's *value* parameter represents the numeric value that you want to format. The *pattern* parameter is a string of code characters, carefully chosen (by you) to produce a particular type of formatted result. The *pattern* string should include one or more special format characters, such as # , 0, % , the comma character, the period, or the semi-colon character; these characters control how the results looks. The *pattern* string can also include one or more cosmetic characters, such as $, - , (, or) , to make the results more attractive. The table below summarizes the format characters.

pattern control characters	Role in formatting results:
#	The result includes one or more digits from the value. However, if the control string contains one or more # characters to the left of the decimal place, and the value is between zero and one, the formatted result string may not include a zero before the decimal place.
0	A digit placeholder similar to the # character; however, if the control string contains one or more 0 characters to the left of the decimal place, and the value is between zero and one, the formatted result string includes a zero before the decimal place.
.	The period character is used in conjunction with the # character. When the pattern string includes a period character, then the number of # characters to the right of the period dictates the number of decimal places that the result string displays.
,	When you include a comma character before the first # character, the result string includes a comma every three digits to the left of the decimal place. The number ten million would appear as "10,000,000" rather than "10000000".
%	The result represents the value multiplied by one hundred; a value of 0.75 produces a result string of "75%". When you wish to include a percent sign in your result, but you do not want MapBasic to multiply the value by one hundred, place a \ (backslash) character before the percent sign (see below)

pattern control characters	Role in formatting results:
E+	The result is formatted according to scientific notation; for example, the value 1234 produce the result "1.234e+03". When the exponent if positive, a plus sign appears after the "e". When the exponent is negative (which is the case for fractional numbers), a minus sign appears after the "e".
E-	This string of control characters functions just as the "E+" string, except that the result never shows a plus sign following the "e".
;	By including a semicolon in your pattern string, you can specify one format for positive numbers and another format for negative numbers. The semicolon should appear after the first set of format characters, and before the second set of format characters. The second set of format characters applies to negative numbers. When your pattern string includes both positive and negative formats in this fashion, the result does not automatically include a minus sign. When you wish to include a minus sign in the results, you should include a "-" character in the second set of format characters. See examples in table below.
\	When the backslash character appears in a pattern string, MapBasic does not perform any special processing for the character that follows the backslash. This allows you to include special characters (such as the percent sign) in the results, without causing the special formatting actions described above.

In the table below, the left column shows sample strings that you could use as the Format$( ) function's *pattern* parameter. The middle column shows sample numbers, such as you might use as the *value* parameter. The right column shows the results that Format$( ) would return, given the parameters from the left columns.

pattern parameter string	*value* parameter	Format$( ) returns:
",#"	12345	"12,345"
",#"	-12345	"-12,345"
"$#"	12345	"$12345"
"$#"	-12345	"-$12345"
"$,#"	12345	"$12,345"
"$,#"	-12345	"-$12,345"
"$,#.##"	12345.678	"$12,345.68"
"$,#.##"	-12345.678	"-$12,345.68"
"$,#.##;($,#.##)"	12345.678	"$12,345.68"
"$,#.##;($,#.##)"	-12345.678	"($12,345.68)"
",#.###"	12345.6789	"12,345.679"
",#.#"	12345.6789	"12,345.7"
"#.#"	12345.6789	"12345.7"
"#.###E+##"	12345.6789	"1.235e+04"
"#.###E+##"	-12345.6789	"-1.235e+04"
"#.###E+##"	0.054321	"5.432e-02"
"#.###E-##"	12345.6789	"1.235e04"
"#.###E-##"	0.054321	"5.432e-02"
"#%"	0.054321	"5%"
"#.##%"	0.054321	"5.43%"
"#.##\%"	0.054321	".05%"
"0.##\%"	0.054321	"0.05%"

InStr

Syntax: InStr(*position, string, substring*)

Action: InStr tests whether of not some *string* has a specific *substring*. MapInfo searches *string* starting at the character position specified by *position*. When *position* is one, MapInfo starts searching at the beginning of *string*. When it has a value of six, MapInfo starts searching at the sixth character in *string*.

When *string* contains *substring*, InStr returns the character position where *substring* starts. When *string* does not contain *substring*, InStr returns zero.

Example: You are preparing to geocode a file and you want to identify all the entires with Post Office boxes for addresses. That means you want all entries that have the string "box" in their address column. They may also have "P.O.", but you cannot be sure of that. Nor can you be sure of how "box" is capitalized in the entries. Here is your expression:

80. `InStr(1,UCase$(Address),"BOX")>0`

This expression directs MapInfo to search the Address column for the string "BOX". All entries containing this string are selected.

Int

Syntax: Int(*num_expr*)

Action: Returns the nearest integer that is less than or equal to the specified value (*num_expr*).

Examples: The following table shows how Int treats various values:

Number	Int(Number)
5.2	5
5.999	5
-7.8	-7
-7.2	-7

LCase$

Syntax: LCase$(*string*)

Action: Returns the lower case of the string.

Examples: Consider the following expression:

81. `LCase$(City)`

The following table shows how it converts an input string (from a column in your table) into a returned string:

Input String	Returned String
NEW YORK	new york
New yorK	new york
new york	new york

Left$

Syntax: Left$(*string, number*)

Action: Returns a string that consists of the leftmost *number* of characters in *string*.

Examples: Consider the following expression:

82. `Left$(City,5)`

The following table shows how that expression converts an input string into a returned string:

Input String	Returned String
New York	New Y
Denver	Denve
Singapore	Singa

Now consider the following expression, where Phone is a column containing telephone numbers prefixed by area codes:

83. `Left$(Phone,3)="404"`

This expression selects all rows where the first three digits of the phone number are "404". Note that the Phone column contains character data and therefore the comparison value, 404, has to be in quotes so MapInfo knows to treat it as a character string.

Len

Syntax: Len(*string*)

Action: Returns the number of characters in a string.

LTrim$

Syntax: LTrim$(*string*)

Action: LTrim$ removes any non-printing characters (e.g. spaces, TABs) from the beginning of *string*.

Maximum

Syntax: Maximum(*num_expr, num_expr*)

Action: Maximum returns the larger of two numbers.

Example: To find the highest address number for a street segment in a StreetInfo file:

84. `Maximum(ToLeft,ToRight)`

ToLeft is the highest address number on the left side of a segment and ToRight is the highest address number of the right side of a segment.

Mid$

Syntax: Mid$(*string, position, length*)

string is a character expression
position is an integer indicating a starting position in *string*
length is an integer indicating the number of characters to extract

Action: Mid$ returns a string of a set *length*, starting at given *position*, in a specified *string*.

Examples: Consider the following expression:

85. `Mid$(City,5,4)`

The following table shows how that expression converts an input string into a returned string:

Input String	Returned String
New York City	York
Denver	er
Singapore	apor

Note that the expression only returned two characters from "Denver". That is because "Denver" is too short to have a four-character string starting at its fifth character.

Minimum

Syntax: Minimum(*num_expr, num_expr*)

Action: Minimum returns the smaller of two numbers.

Examples: To find the lowest address number for a street segment in a StreetInfo file:

86. `Minimum(FromLeft,FromRight)`

FromLeft is the highest address number on the left side of a segment and FromRight is the highest address number of the right side of a segment.

Month

Syntax: Month(*datefield*)

Action: Returns the month of the date as a number, 1 through 12.

Examples: To select all received in August:

87. `Month(received)=8`

To select all received before August:

88. `Month(received)<8`

To select all received in August 1990:

89. `Month(received)=8 and Year(received)=1990`

This expression has two clauses. The first specifies that the month must be August and the second that the year must be 1990. The clauses are connected by "and" and so both must be true for a row to be selected.

To select all received in August or September:

90. `Month(received)=8 or Month(received)=9`

This expression has two clauses. The first selects rows where the month is August and the second selects rows where the month is September. Since the clauses are connected by "or" only one must be true for a row to be selected.

To select all received in August or September:

91. `Month(received)=any(8,9)`

This expression achieves the same result as 24, but it formulated using the keyword "any".

To select all received in August or September of 1990:

92. `Month(received)=any(8,9) and Year(received)=1990`

This expression has two clauses. The first selects rows where the month is August or September and the second selects rows where the year is 1990. The clauses are connected by "and" and so both must be true for a row to be selected.

ObjectLen

Syntax: ObjectLen(*obj, unit*)

Action: Returns the length of lines and polylines. Returns a value of 0 for other objects.

When you choose ObjectLen from a menu the "obj" keyword is placed between the parentheses along with the current unit in double-quotes. In most cases the current unit is miles. When you want length to be in some other unit, you should type the unit in, between quotes. The units available are:

Unit Name	Unit Represented
"mi"	miles
"km"	kilometers
"in"	inches
"ft"	feet
"survey ft"	survey feet
"yd"	yards
"mm"	millimeters
"cm"	centimeters
"m"	meters
"nmi"	nautical miles (1 nautical mile represents 1852 meters)

Examples: To calculate the length of an object:

93. `ObjectLen(obj, "mi")`

To have the length calculated in kilometers:

94. `ObjectLen(obj,"km")`

To have the length calculated in nautical miles:

95. `ObjectLen(obj, "nmi")`

When you wanted to convert from kilometers to miles you would use a conversion factor of .621.

To select all objects more than 10 miles long:

96. `ObjectLen(obj, "mi")>10`

Perimeter

Syntax: Perimeter(*obj, unit*)

Action: Returns the perimeter of the object for polygons, ellipses, rectangles, and rounded rectangles. When you choose Perimeter from a menu the "obj" keyword is placed between the parentheses along with the current unit in double-quotes. In most cases the current unit is miles. When you want perimeter to be in some other unit, you should type the unit in, between quotes. The units available are:

Unit Name	Unit Represented
"mi"	miles
"km"	kilometers
"in"	inches
"ft"	feet
"survey ft"	survey feet
"yd"	yards
"mm"	millimeters
"cm"	centimeters
"m"	meters
"nmi"	nautical miles (1 nautical mile represents 1852 meters)

Examples: To calculate the perimeter of an object:

97. `Perimeter(obj, "mi")`

To calculate the perimeter in kilometers:

98. `Perimeter(obj, "km")`

To calculate the Perimeter in meters"

99. `Perimeter(obj, "m")`

To select all objects with a perimeter greater than 35 miles long:

100. `Perimeter(obj, "mi")>35`

Proper$

Syntax: Proper$(*string*)

Action: Returns a string that has the first letter of each word capitalized and all other letters lowercase.

Examples: Consider the following expression:

101. `Proper$(City)`

The following table shows how it converts an input string (from a column in your table) into a returned string:

Input String	Returned String
NEW YORK	New York
New yorK	New York
new york	New York
New York	New York

Right$( )

Syntax: Right$ (string_expr, num_expr)

Action: Returns part or all of a string beginning at the right end of the string.

Example:

```
102. Dim whole, partial As String

     whole = "Afghanistan"
     partial = Right$ (whole, 4)
     '
     '  at this point, partial contains the string: "stan"
```

Round

Syntax: Round(*number1, number2*)

Action: Returns the rounded number1. number2 specifies how to round it.

Examples: Consider the following expression:

103. `Round(number1, number2)`

The table below gives examples. The first column contains the function arguments (*number1, number2*) and the second column contains the rounded result.

Arguments	Rounded Number
14347,10000	10000
14347, 100	14300
14347, 10	14350
12.18353, .1	12.20000
12.18353, .001	12.18300

To select all rows where the median age is 42, you might use the following expression:

104. `Round(MED_AGE, 1)=42`

Depending on your data, this expression may give better results than one that compares median age directly with a target value (`MED_AGE=42`). The median age column in MapInfo's states table has the median age calculated to one decimal place. When we compare those values directly with 42 MapInfo would not select records where the median age is, for example, 41.7, 42.1, or 42.4. Yet we probably want those records. By rounding the median age value to a whole number, we can get those values.

RTrim$

Syntax: RTrim$(*string*)

Action: RTrim$ removes any white-space characters (e.g. spaces, and TABs) from the end of *string*.

Sin

Syntax: Sin(*num_expr*)

Action: The Sin function returns the sine of the value of a numeric expression, where that expression represents an angle expressed in radians.

Str$

Syntax: Str$(*num_expr*)

Action: Str$ converts a numerical expression into a string that represents it. When the value of the numerical expression is negative the first character in the string with be a negative sign (-). Otherwise, the first character in the returned string is a space.

UCase$

Syntax: UCase$(*string*)

Action: Returns the upper case of the string.

Examples: Consider the following expression:

105. `UCase$(City)`

The following table shows how it converts an input string (from a column in your table) into a returned string:

Input String	Returned String
NEW YORK	NEW YORK
New yorK	NEW YORK
new york	NEW YORK

Val

Syntax: Val(*char_expr*)

Action: The Val function extracts a numerical value from a character expression. It ignores any tabs, spaces, and line feeds at the start of a string and then tries to interpret the first sequence of numeric characters as a numerical value. It stops processing the string as soon as it finds a non-numeric character. When the first character after initial tabs, spaces, and line feeds is not a numeric character, Val returns a value of zero.

Examples: The following table illustrates how Val extracts a numerical value from an input string:

char_expr	Val(*char_expr*)
12 thousand	12
52 - 62 Brunswick	52
Eighteen	0
Box 239	0

Weekday

Syntax: Weekday(*datefield*)

Action: Returns the day of the week from the data. The day is given as a number between one and seven. One is Sunday and Seven is Saturday.

Examples: To select all rows where the weekday is Wednesday:

106. `Weekday(date)=4`

To select all rows where the weekday is Wednesday,Thursday or Friday:

107.) `Weekday(date)=any(4,5,6)`

The "any" keyword directs MapInfo to select any row where the week day is one of the specified days.

To select all rows where the day is Friday and the month is July:

108. `Weekday(date)=6 and Month(date)=7`

This expression has two clauses. The first clause uses the Weekday function to select records where the day of the week is a Friday. The second clause uses the Month function to select records where the month is July. Since the two clauses are connected by "and" both clauses must be true for a row to be selected.

Year

Syntax: Year(*datefield*)

Action: Returns the year of the date.

Examples: To find all orders received in 1990:

109. `Year(date)=1990`

To find all orders received in 1990 or 1991:

110. `Year(date)=any(1990,1991)`

To find all orders received between 1985 and 1990, including those orders received in 1985 and 1990:

111. `Year(date)>=1985 and Year(date)<=1990`

This expression has two clauses. The first selects all rows where the date is 1985 or greater. The second clause selects all rows where the date is 1990 or less. Both clauses must be satisfied for a row to be selected.

Appendix 6 Creating Your Own Coordinate System

MapInfo provides over 300 predefined coordinate systems. However, you may want to use another coordinate system. You create another coordinate system by changing the parameters of one of the predefined systems or by defining new coordinate systems from scratch. This section tells you what those parameters are and how to make the changes.

This section includes the following:

- Projections and Coordinate Systems.
- Elements of a Coordinate System.
- Editing the MAPINFOW.PRJ [MapInfo Projections] File.

Projections and Coordinate Systems

While the terms "projection" and "coordinate system" are often used interchangeably, they do not have the same meaning. A projection is an equation or set of equations containing a set of parameters—the exact number and nature of the parameters depends on the projection. When each of those parameters has been assigned a specific value, the result is a coordinate system. The items listed in the Choose Projection dialog are coordinate systems, not projections, as we call them elsewhere in this manual.

To create your own coordinate system pick the pre-defined system that is closest to your needs and substitute new values for some of its parameters.

Elements of a Coordinate System

This section briefly defines the elements of a coordinate system. The first element in defining a coordinate system is the set of equations for the system's projection. The elements after that are the parameters for the projection. None of the coordinate systems require all of these parameters.

Projections and Their Parameters

The following table indicates the parameters applicable to each projection. The parameters are listed in the order they appear in the *MAPINFOW.PRJ [MapInfo Projections]* file.

	Datum	Units	Origin, Longitude	Origin, Latitude	Standard Parallel 1	Standard Parallel 2	Azimuth	Scale Factor	False Easting	False Northing	Range
Albers Equal-Area Conic	X	X	X	X	X	X			X	X	
Azimuthal Equidistant	X	X	X	X							X
Cylindrical Equal_Area	X	X	X		X						
Eckert IV	X	X	X								
Eckert VI	X	X	X								
Equidistant Conic	X	X	X	X	X	X			X	X	
Gall	X	X	X								
Hotine Oblique Mercator	X	X	X	X			X	X	X	X	
Lambert Azimuthal Equal-Area	X	X	X	X							X
Lambert Conformal Conic	X	X	X	X	X	X			X	X	
Longitude-Latitude	X										
Mercator	X	X	X								
Miller	X	X	X								
Mollweide	X	X	X								
Robinson	X	X	X								
Sinusoidal	X	X	X								
Transverse Mercator	X	X	X	X				X	X	X	

Projection

The projection is the equation or equations used by a coordinate system. The following list names the projections MapInfo uses and gives the number used to identify the projection in the *MAPINFOW.PRJ [MapInfo Projections]* file:

Number	Projection
9	Albers Equal-Area Conic
5	Azimuthal Equidistant
2	Cylindrical Equal-Area
14	Eckert IV
15	Eckert VI
6	Equidistant Conic, also known as Simple Conic
17	Gall
7	Hotine Oblique Mercator
4	Lambert Azimuthal Equal-Area
3	Lambert Conformal Conic
1	Longitude/Latitude
10	Mercator
11	Miller Cylindrical
13	Mollweide
12	Robinson
16	Sinusoidal
8	Transverse Mercator , also known as Gauss-Kruger

Datum

The datum is established by tying a reference ellipsoid to a particular point on the earth. The following tables lists:

- The datums.
- The maps where they are typically used.
- Their reference ellipsoid.
- The number used to identify the datum in the *MAPINFOW.PRJ (MapInfo Projections)* file.

Number	Datum	Area	Ellipsoid
1	Adindan	Ethiopia, Mali, Senegal, Sudan	Clarke 1880
2	Afgooye	Somalia	Krassovsky
3	Ain el Abd 1970	Bahrain Island	International
4	Anna 1 Astro 1965	Cocos Islands	Australian National
5	Arc 1950	Botswana, Lesotho, Malawi, Swaziland, Zaire, Zambia, Zimbabwe	Clarke 1880
6	Arc 1960	Kenya, Tanzania	Clarke 1880
7	Ascension Island 1958	Ascension Island	International
8	Astro Beacon "E"	Iwo Jima Island	International
9	Astro B4 Sorol Atoll	Tern Island	International
10	Astro DOS 71/4	St. Helena Island	International
11	Astronomic Station 1952	Marcus Island	International
12	Australian Geodetic 1966 (AGD 66)	Australia and Tasmania Island	Australian National
13	Australian Geodetic 1984 (AGD 84)	Australia and Tasmania Island	Australian National
14	Bellevue (IGN)	Efate and Erromango Islands	International
15	Bermuda 1957	Bermuda Islands	Clarke 1866
16	Bogota Observatory	Colombia	International
17	Campo Inchauspe	Argentina	International
18	Canton Astro 1966	Phoenix Islands	International
19	Cape	South Africa	Clarke 1880
20	Cape Canaveral	Florida and Bahama Islands	Clarke 1866
21	Carthage	Tunisia	Clarke 1880
22	Chatham 1971	Chatham Island (New Zealand)	International

Number	Datum	Area	Ellipsoid
23	Chua Astro	Paraguay	International
24	Corrego Alegre	Brazil	International
25	Djakarta (Batavia)	Sumatra Island (Indonesia)	Bessel 1841
26	DOS 1968	Gizo Island (New Georgia Islands)	International
27	Easter Island 1967	Easter Island	International
28	European 1950 (ED 50)	Austria, Belgium, Denmark, Finland, France, Germany, Gibraltar, Greece, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland	International
29	European 1979 (ED 79)	Austria, Finland, Netherlands, Norway, Spain, Sweden, Switzerland	International
30	Gandajika Base	Republic of Maldives	International
31	Geodetic Datum 1949	New Zealand	International
32	Geodetic Reference System 1967 (GRS 67)	Worldwide	GRS 67
33	Geodetic Reference System 1980 (GRS 80)	Worldwide	GRS 80
34	Guam 1963	Guam Island	Clarke 1866
35	GUX 1 Astro	Guadalcanal Island	International
36	Hito XVIII 1963	South Chile (near 53°S)	International
37	Hjorsey 1955	Iceland	International
38	Hong Kong 1963	Hong Kong	International
39	Hu-Tzu-Shan	Taiwan	International
40	Indian	Thailand and Vietnam	Everest
41	Indian	Bangladesh, India, Nepal	Everest
42	Ireland 1965	Ireland	Modified Airy
43	ISTS 073 Astro 1969	Diego Garcia	International
44	Johnston Island 1961	Johnston Island	International
45	Kandawala	Sri Lanka	Everest
46	Kerguelen Island	Kerguelen Island	International
47	Kertau 1948	West Malaysia and Singapore	Modified Everest
48	L.C. 5 Astro	Cayman Brac Island	Clarke 1866
49	Liberia 1964	Liberia	Clarke 1880

Number	Datum	Area	Ellipsoid
50	Luzon	Philippines (excluding Mindanao Island)	Clarke 1866
51	Luzon	Mindanao Island	Clarke 1866
52	Mahe 1971	Mahe Island	Clarke 1880
53	Marco Astro	Salvage Islands	International
54	Massawa	Eritrea (Ethiopia)	Bessel 1841
55	Merchich	Morocco	Clarke 1880
56	Midway Astro 1961	Midway Island	International
57	Minna	Nigeria	Clarke 1880
58	Nahrwan	Masirah Island (Oman)	Clarke 1880
59	Nahrwan	United Arab Emirates	Clarke 1880
60	Nahrwan	Saudi Arabia	Clarke 1880
61	Naparima, BWI	Trinidad and Tobago	International
62	North American 1927 (NAD 27)	Continental US	Clarke 1866
63	North American 1927 (NAD 27)	Alaska	Clarke 1866
64	North American 1927 (NAD 27)	Bahamas (excluding San Salvador Island)	Clarke 1866
65	North American 1927 (NAD 27)	San Salvador Island	Clarke 1866
66	North American 1927 (NAD 27)	Canada (including Newfoundland Island)	Clarke 1866
67	North American 1927 (NAD 27)	Canal Zone	Clarke 1866
68	North American 1927 (NAD 27)	Caribbean (Barbados, Caicos Islands, Cuba, Dominican Republic, Grand Cayman, Jamaica, Leeward Islands, and Turks Islands)	Clarke 1866
69	North American 1927 (NAD 27)	Central America (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua)	Clarke 1866
70	North American 1927 (NAD 27)	Cuba	Clarke 1866
71	North American 1927 (NAD 27)	Greenland (Hayes Peninsula)	Clarke 1866
72	North American 1927 (NAD 27)	Mexico	Clarke 1866

Number	Datum	Area	Ellipsoid
73	North American 1927 (NAD 27)	Michigan (used only for State Plane Coordinate System 1927)	Modified Clarke 1866
74	North American 1983 (NAD 83)	Alaska, Canada, Central America, Continental US, Mexico	GRS 80
75	Observatorio 1966	Corvo and Flores Islands (Azores)	International
76	Old Egyptian	Egypt	Helmert 1906
77	Old Hawaiian	Hawaii	Clarke 1866
78	Oman	Oman	Clarke 1880
79	Ordnance Survey of Great Britain 1936	England, Isle of Man, Scotland, Shetland Islands, Wales	Airy
80	Pico de las Nieves	Canary Islands	International
81	Pitcairn Astro 1967	Pitcairn Island	International
36	Provisional South Chilean 1963	South Chile (near 53°S)	International
82	Provisional South American 1956	Bolivia, Chile, Colombia, Ecuador, Guyana, Peru, Venezuela	International
83	Puerto Rico	Puerto Rico and Virgin Islands	Clarke 1866
84	Qatar National	Qatar	International
85	Qornoq	South Greenland	International
86	Reunion	Mascarene Island	International
87	Rome 1940	Sardinia Island	International
88	Santo (DOS)	Espirito Santo Island	International
89	São Braz	São Miguel, Santa Maria Islands (Azores)	International
90	Sapper Hill 1943	East Falkland Island	International
91	Schwarzeck	Namibia	Modified Bessel 1841
92	South American 1969	Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Venezuela, Trinidad, and Tobago	South American 1969
93	South Asia	Singapore	Modified Fischer 1960
94	Southeast Base	Porto Santo and Madeira Islands	International

Number	Datum	Area	Ellipsoid
95	Southwest Base	Faial, Graciosa, Pico, Sao Jorge, Terceira Islands (Azores)	International
96	Timbalai 1948	Brunei and East Malaysia (Sarawak and Sabah)	Everest
97	Tokyo	Japan, Korea, Okinawa	Bessel 1841
98	Tristan Astro 1968	Tristan da Cunha	International
99	Viti Levu 1916	Viti Levu Island (Fiji Islands)	Clarke 1880
100	Wake-Eniwetok 1960	Marshall Islands	Hough
101	World Geodetic System 1960 (WGS 60)	Worldwide	WGS 60
102	World Geodetic System 1966 (WGS 66)	Worldwide	WGS 66
103	World Geodetic System 1972 (WGS 72)	Worldwide	WGS 72
104	World Geodetic System 1984 (WGS 84)	Worldwide	WGS 84
105	Yacare	Uruguay	International
106	Zanderij	Surinam	International

Units

The following table lists the available coordinate units and the number used to identify the unit in the MAPINFOW.PRJ [MapInfo Projections] file:

Number	Units
6	Centimeters
3	Feet (also called International Feet)*
2	inches
1	Kilometers
7	Meters
0	Miles
5	Millimeters
9	Nautical Miles**
8	US Survey Feet (used for 1927 State Plane)***
4	Yards

* One International Foot equals exactly 30.48 cm.
** One Nautical Mile equals exactly 1852 meters.
*** One US Survey Foot equals exactly 12/39.37 meters, or approximately 30.48006 cm.

Coordinate System Origin

The origin is the point specified in longitude and latitude from which all coordinates are referenced. It is chosen to optimize the accuracy of a particular coordinate system. As we move north from the origin, X increases. Y increases as we move east. These coordinate values are generally called northings and eastings.

For the Transverse Mercator projection the origin's longitude defines the central meridian. In constructing the Transverse Mercator projection a cylinder is positioned tangent to the earth. The central meridian is the line of tangency. The scale of the projected map is true along the central meridian.

In creating a Hotine Oblique Mercator projection it is necessary to specify a great circle that is not the equator nor a meridian. MapInfo does this by specifying one point on the ellipsoid and an azimuth from that point. That point is the origin of the coordinate system.

Standard Parallels (Conic Projections)

In conic projections a cone is passed through the earth intersecting it along two parallels of latitude. These are the standard parallels. One is to the north and one is to the south of the projection zone. To use a single standard parallel specify that latitude twice. Both are expressed in degrees of latitude.

Oblique Azimuth (Hotine Oblique Mercator)

When specifying a great circle (Hotine Oblique Mercator) using a point and an azimuth, the azimuth is called the Oblique Azimuth and is expressed in degrees.

Scale Factor (Transverse Mercator)

A scale factor is applied to cylindrical coordinates to average scale error over the central area of the map while reducing the error along the east and west boundaries. The scale factor has the effect of recessing the cylinder into the earth so that it has two lines of intersection. Scale is true along these lines of intersection.

You may see the scale factor expressed as a ratio, such as 1:25000. In this case it is generally called the scale reduction. The relationship between scale factor and scale reduction is:

scale factor = 1-scale reduction

In this case the scale factor would be 1-(1/25000) or 0.99996.

False Northings and False Eastings

Calculating coordinates is easier if negative numbers aren't involved. To eliminate this problem in calculating State Plane and Universal Transverse Mercator coordinates, it is common to add measurement offsets to the northings and eastings. These offsets are called False Northings and False Eastings. They are expressed in coordinate units, not degrees. (The coordinate units are specified by the Units parameter.)

Range (Azimuthal Projections)

The range specifies, in degrees, how much of the earth you are seeing. The range can be between 1 and 180. When you specify 90, you see a hemisphere. When you specify 180 you see the whole earth, though much of it is very distorted.

Editing the MAPINFOW.PRJ [MapInfo Projections] File

The *MAPINFOW.PRJ [MapInfo Projections]* file lists the parameters for each coordinate system on a separate line, as in the following examples:

```
"Mollweide", 13, 12, 7, 0

"Albers Equal-Area Conic (Alaska)", 9, 7, 7, -154, 50, 55, 65, 0, 0

"Alabama, Western Zone (1983)", 8, 0, 7, -87.5, 30.0, 0.9999333333,
600000, 0

"UTM Zone 9", 8, 7, 7, -129, 0, 0.9996, 500000, 0
```

The first element in each list is the name of the coordinate system in quotes. The second element in each list is the number that identifies the projection. The remaining elements in the list are the parameter values for that particular coordinate system. The elements in the list are separated by commas. They are listed in the order given in the list of coordinates and their elements.

Editing and Saving Your Projection File

To edit and save your projection file:

1. Open *MAPINFOW.PRJ [MapInfo Projections]* in a text editor or word processor.
2. Make a copy of the entry you want to use as the basis of your custom coordinate system.
3. Make the necessary changes, including creating a new name for your coordinate system.
4. Move your new coordinate system to the appropriate place in the list of coordinate systems.
5. Save your edited *MAPINFOW.PRJ [MapInfo Projections]* file.

You can now use your custom coordinate system just as you would use any of the coordinates that come with MapInfo.

There are other ways you can edit this file. When you want a shorter list remove coordinate systems from the file. You can also change the names, change group headings and reorder the file to suit your needs.

Note: Group headings are distinguished by the hyphen at the beginning of the name and names of coordinate systems cannot begin with a hyphen or a space.

For more information on projections:

The first three publications listed below are relatively short pamphlets. The last two are substantial books. We've also given addresses and phone numbers for the American Congress of Surveying and Mapping (the pamphlets) and the U.S. Geological Survey (the books).

American Cartographic Association. *Choosing a World Map—Attributes, Distortions, Classes, Aspects.* Falls Church, VA: American Congress on Surveying and Mapping. Special Publication No. 2. 1988.

American Cartographic Association. *Matching the Map Projection the Need.* Falls Church, VA: American Congress on Surveying and Mapping. Special Publication No. 3. 1991.

American Cartographic Association. *Which Map is Best? Projections for World Maps.* Falls Church, VA: American Congress on Surveying and Mapping. Special Publication No. 1. 1986.

John P. Snyder. *Map Projections—A Working Manual.* Washington: U.S. Geological Survey Professional Paper 1395. 1987

John P. Snyder and Philip M. Voxland. *An Album of Map Projections.* Washington: U.S. Geological Survey Professional Paper 1453. 1989.

Addresses and phone numbers:

American Congress on Surveying and Mapping
210 Little Falls St.
Falls Church, VA 22046
703-241-2446

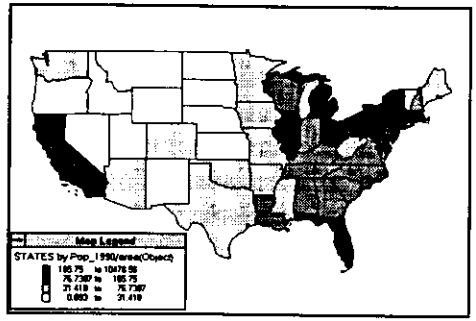
Earth Science Information Center
U.S. Geological Survey
507 National Center
Reston, VA 22092
703-860-6045 or 1-800-USA-MAPS

Appendix 7 Shade by Value

Samples of Thematic Maps

Ranged Maps

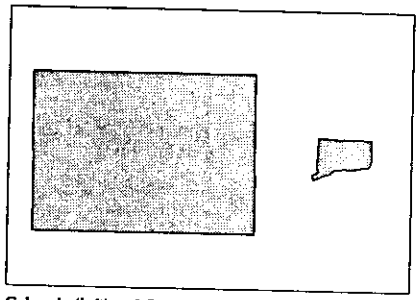
Perhaps the most common type of thematic map is one where the data values are divided into several different ranges. All of the objects falling in the same range are represented in the same way. In the following illustration, states have been grouped into four different ranges according to population density.



United States, thematically shaded according to population density

The United States is shaded according to population density. All of the states falling into the same density range are shaded the same.

However natural it may seem, cartographers generally recommend against using ranged maps for raw counts, such as population. What concerns them is that this kind of map does not take into account the fact that population is not evenly distributed. People are densely packed in some areas and loosely packed in other areas. For example, Connecticut has a population of 3,226,922 and Colorado has a population of 3,272,460 (you can verify these numbers by using the Info tool and clicking on these states). But Colorado covers a much greater area than Connecticut does.



Colorado (left) and Connecticut (right).

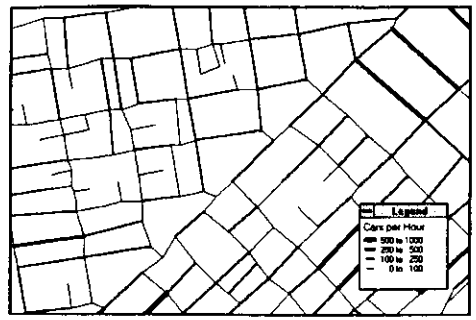
Because of this, there is a tendency to perceive Colorado as having a larger population than Connecticut, even though the two have much the same population and they are shaded the same. Cartographers recommend using dot density maps for raw counts (see page 378).

Cartographers recommend that you use thematic ranges for ratio information. One obvious ratio variable is population density, which is area divided by population. Any average or median is a ratio variable, such as:

- Median age—total age divided by number of people
- Median income—total income divided by number of earners

Ranged maps are also appropriate for values of things where the magnitude does not depend directly on geographic area. For example, the total value of sales for a region probably depends more on how many people live in the area than on how big the area is. A small area can have many people, and high sales, while a large area can have few people, and small sales. Because there is no clear relationship between sales and area, the use of ranged maps is appropriate. Similar weather map showing inches of precipitation can be shaded in ranges. The number of inches of precipitation has no relation to the overall area of a region.

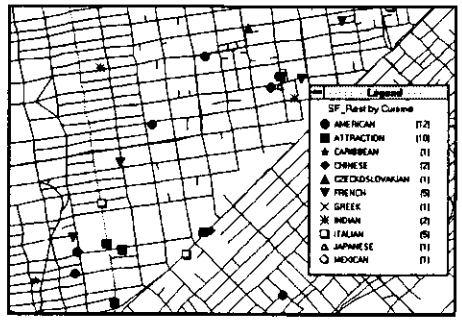
The following map is also a ranged map. Instead of showing data ranges as different shadings on regions, it shows data values as different widths of streets. In this map the width of the street segment indicates how many cars travel over it in an hour. The traffic figures were divided into four ranges and the width of a segment was set according to its range.



The width of the street indicates how much traffic it has.

Individual Values

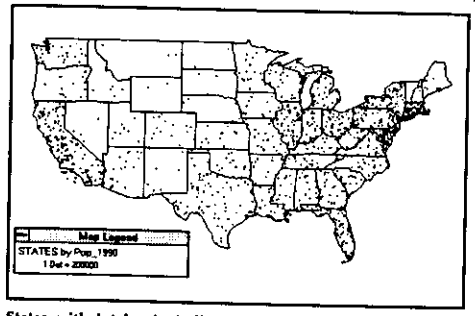
You can also map individual values. The next map shows restaurants. The symbol used to indicate the restaurant depends on its cuisine. In this case it does not make sense to have ranges. Instead, each individual cuisine is assigned a particular symbol and that symbol is used to indicate all restaurants of that type.



Restaurants shaded according to type of cuisine.

Dot Density

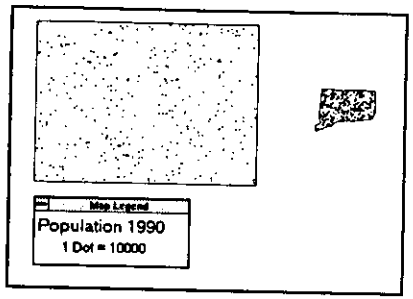
Dot density mapping is another common thematic technique. In dot density mapping dots are used to represent a quantity of items. In the example below, each dot represents 200,000 people. The number of dots in an area indicates how many people live in the region.



States, with dot density indicating population

The dots are distributed randomly within a region. The number of dots within a region represents the relative value, but the locations of the dots within a region are not meaningful.

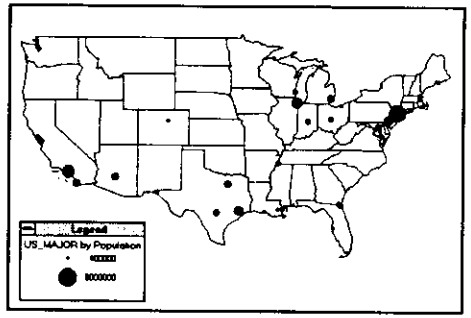
Cartographers generally recommend that you use dot density for mapping raw counts, such as population values, numbers of crimes in an area, etc. That is because the data value is represented by the number of dots, not the area of a region. To pick up the comparison between Colorado and Connecticut from the discussion of ranged maps, if each dot represents 10,000 people, you would place 323 dots inside Colorado, indicating that Colorado has approximately 3,230,000 people. Similarly, Connecticut would also get 323 dots. Because Connecticut is so much smaller than Colorado, the dots would be more closely packed. The point is that, in a dot density map you judge the magnitude of the thematic variable by judging the number of dots, and are not so likely to be fooled by comparing areas.



Dot density map of Colorado and Connecticut

Graduated Symbols

In this method the size of a symbol is made proportional to its data value. The values are not grouped into ranges. Rather, the size of the symbol varies continuously along with the data values. A large symbol indicates a high data value; a small symbol indicates a low value. Symbols of intermediate size indicate intermediate values. The following map shows cities in the Southeast mapped according to the population of their metropolitan areas.



Major cities in the United States shaded according to their size.

Creating a Thematic Map

The quantity that is being represented is called the **thematic variable**. To create a thematic map you need to know:

- What the thematic variable is.
- Whether you use data from the table you are shading or from some other table.
- Which of the four thematic methods you want to use.

The thematic variable can be the values in a column, such as Pop_1990, Buy_Power, or Median_Age. The thematic variable can also be created by an expression. For example, you could use the following expression to display population density:

```
Pop_1990/Area(obj, "sq mi")
```

Regardless of whether your thematic variable is a single column or an expression, the data may be in the table being shaded or it may be in some other table. For example, MapInfo's States table contains several columns of statistical data. But the StatInfo tables—Usstinc,

Usstbus, Usstret, Usstpop—contain much more data. These StatInfo tables do not, however, contain graphic objects; they cannot be mapped by themselves. You can, however, use data from one of these tables to shade the States table. More generally, you may have map tables with no statistical information. But you can map them thematically by using data in other tables.

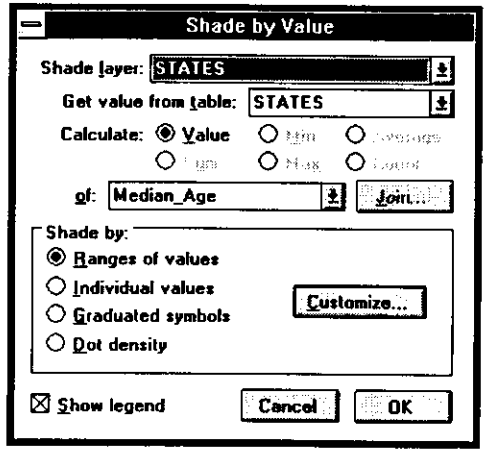
You also have to choose a thematic technique. Different techniques are appropriate to different kinds of graphic objects:

	Regions	Lines	Symbols
Ranges of values	X	X	X
Individual values	X	X	X
Graduated symbols			X
Dot density	X		

Because thematic mapping is so versatile, you may have to use other dialogs in addition to the main Shade by Value dialog:

- Customize: When you want to use any settings other than the default settings, you need to use Shade by Value's Customize dialogs. These allow you to pick the colors, patterns, symbols, and to set your own ranges. We describe these options below.
- Expression: You can use expressions to calculate thematic values. Use the Expression dialog to enter expressions into Shade by Value.
- Join: When you are shading one table and getting data values from another, you may have to use the Join dialog if MapInfo cannot make the join automatically.

The Shade by Value Dialog



Use the basic dialog to specify:

- The table to be shaded
- The table containing the data on which the shading is based, which is not necessarily the table being shaded
- The type of thematic operation

Fill in the dialog as follows:

- Shade Layer: Use this menu to pick the layer you want to shade.
- Get Value From Table: Use this menu to choose the table containing the values on which the shading is to be based. This is called the source table.
- Calculate: Here you tell MapInfo how to produce the thematic values. Your choice of options is dictated by the data you are using in the Shade by Value operation. Whether you are shading one table with data found in another or shading a table with its own data, you have two ways to create thematic values:

You can use values stored in a single column and you can use a mathematical expression based on values in one or more tables.

When you want to use a thematic expression, choose Expression from the menu.

When you are shading a table based on its own data values, MapInfo automatically picks the Value option. When you are shading one table based on data in another table, then you must specify one of (discussed below): Min, Average, Sum, Max, Count.

Where your data table has the same number of records as your shaded table—that is, one data record for each object—it doesn't make much difference whether you choose Sum, Min, Max, or Average, but you should not choose Count. MapInfo picks the one record in the data table which matches the one record in the shaded table. This would be the case, for example, if you are shading States according to values in Usstinc, which contains statistical information about each state but is not, by itself, mappable. Each table has a record for each state. MapInfo would make the appropriate match and do the shading.

However, you might want to shade States by values in a table of U.S. cities. In this case there would be multiple city records for each state record. In this case MapInfo needs to know whether you want to add the values for all cities in a state (Sum), take the highest value (Max), the lowest value (Min), the average value (Average), or the number of cities in the state (Count). You would have a similar situation if you wanted to shade a table of counties by using values stored in a table of ZIP Codes. There are generally multiple ZIP Codes in each county.

Shade by Value uses the following aggregate functions:

- Count(*): simply counts the number of records in a group. It takes * as its argument simply because it applies to the record as a whole, and not to any particular field in the record.
- Sum (*expression*): calculates the sum of the values in *expression* for all the records in a group.
- Average (*expression*): calculates the average of the values in *expression* for all the records in a group.
- Max (*expression*): finds the highest value in *expression* for all records in a group.
- Min(*expression*): finds the lowest value in *expression* for all records in a group.

You can shade by the following methods:

- Ranges of values: When you choose Ranges Of Values, MapInfo colors the records according to ranges on the appropriate value; the graphic object for each record within the range is assigned the color for the range.
- Individual values: When you choose Individual Values, each value has a unique color and the graphic objects are colored accordingly. MapInfo can assign colors automatically using its defaults. Use this option to shade based on character strings or logical expressions (True/False).
- Graduated Symbol: This option only works with symbols. The symbols are drawn in a size which is proportional to the data value associated with the object.
- Dot Density: This option works only with regions. In this option, each region is peppered with dots, with the number of dots being proportional to the data value associated with each region.

You can use a Customize dialog, explained below, to set various options for your thematic shading. Otherwise you get MapInfo's default settings. Simply click on the Customize button to get this dialog.

- Show Legend: Check this box if you want a legend displayed. By default, the box is checked.
- Cancel: Cancels the current shading parameters and removes the dialog box.
- OK: Click here to have MapInfo create the shaded map.

Re-entering Shade by Value

When you re-enter the Shade by Value dialog after having done a thematic map, the dialog is set-up as it was when you did that map. When you want to change only your ranges or your colors, you do not have to change anything in the main dialog. You can go directly to the Customize dialog to do this. When you want to shade by information in a different column, or if you want to use a different aggregation method (in the case where you are shading by information from a source table which is not your map table), then you have to redo the Calculate area of the main dialog.

Virtual Column

When you shade one table according to data from another, MapInfo places a temporary "virtual" column in the shaded table. This virtual column contains the thematic values. When you browse the shaded table you can view this column. The Browser below shows a column called "SumOFUSSTINC_TOT_INC_80". That column contains information from the Usstinc table which was used in shading States.

STATES Browser

Retail_Sal	SumOfUSSTINC_TOT_INC_80
4507806	4096066
19147700	22949774
11733830	12836424
19271800	19139762
180000000	196324743
22288660	23114470
24490990	26448287
3392998	5719175
4503995	4426928
78835840	70852768
36583720	34973296

records 1 - 11 of 51

MapInfo placed that information into States and we can see it in a Browser. When we had shaded States by some expression involving information from Usstinc, the expression values would similarly be placed in a virtual column. Further, if we shaded states several times, using different variables, there would be a virtual column for each of those variables.

When you want to save these temporary columns in your shaded table, you can do so by using Save Copy As on your shaded table. The new table with contain all of the original columns in your shade table plus each of the virtual columns.

Saving Your Thematic Analysis

Finally, there is a way to save your thematic shading and data. Once you have your map just the way you want it, save your set-up as a workspace (Save Workspace As). That workspace contains your thematic shading. If you have shaded States and have saved your set-up as

Urban_P ("p" for population), when you add the Urban_P workspace, States comes up with the appropriate shading.

When you want to make several shadings for a table, and save them all, you have to save each of them as a different workspace. Note that while the tables in a workspace may be very large, the workspace file itself is not. That's because the workspace file only contains a list of what tables were in the workspace; it doesn't contain the tables themselves. Saving several workspaces is not going to eat up disk space.

Customizing Your Thematic Map

You may customize your shading rather than using MapInfo's default settings. Do this through Customize. When you press Customize MapInfo gives you one of four different dialogs, depending on which shading method you have chosen.

Ranges of Values

By default, MapInfo creates four ranges with approximately the same number of records in each range. MapInfo assigns a different color and pattern (brush) to each of these ranges.

You can customize both of these aspects of your map:

- The number of ranges and their upper and lower bounds,
- The colors, patterns, and sizes used for each range.

Setting Your Range Values

Choosing how MapInfo classes your data values into different ranges is the most important aspect of creating a ranged map. MapInfo has two ways of doing this automatically:

- Equal number of records per range.
- Equal size of ranges.

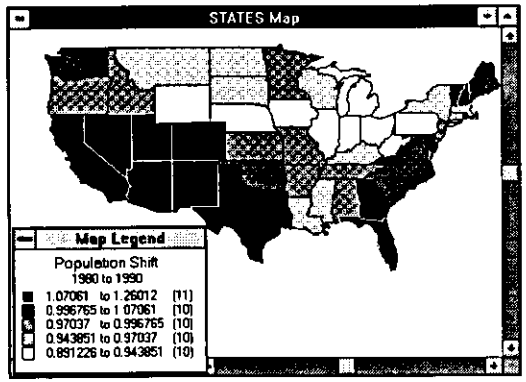
When you choose to have an equal number of records per range (MapInfo's default) MapInfo orders the records from lowest value to highest and then, starting at one end of this distribution, place the same number of records in each range. MapInfo displays a bar chart of the distribution in the Customize Ranges dialog. The bars are approximately equal:

For example, if you have 75 records and want five ranges, then there are 15 records in each of five ranges. The records with the lowest 15 values are in the bottom range while the records with the highest values are in the top range. The other records are appropriately distributed in the ranges in between. Similarly, if you want only three ranges, each contains 25 records. When you want 4 ranges, one contains 18 records and three contain 19 records.

However, that the data may not always allow MapInfo to place an equal number of objects in each range. When you had 37 records, and each had the same value, then MapInfo would put them all in the same range regardless of how many ranges you specified. When you

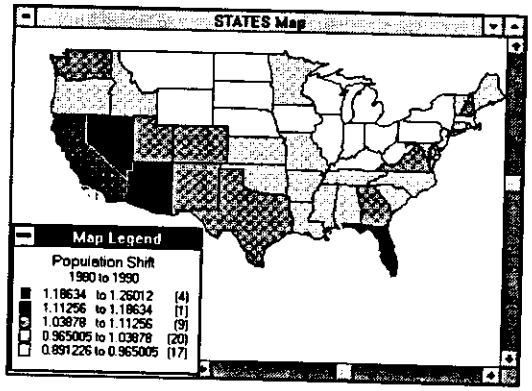
choose this option and see that the ranges are quite unequal, this is the reason. Several records have the same value and MapInfo has placed them all in one range.

The map below shows states mapped according population change between 1980 and 1990. The darker the shading, the more population a state has gained during the decade. This map has five ranges, each with an approximately equal number of records:

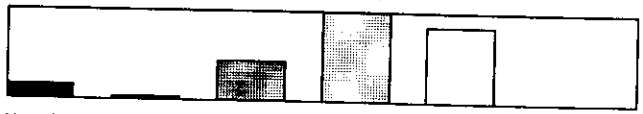


When you choose to have equal sized ranges MapInfo calculate the upper and lower values for each range so that the difference between the two values is the same for each range. For example, if you have data values ranging from 1 to 100 and you produce a shaded map with four equal size ranges, the ranges are 1-25, 25-50, 50-75, and 75-100. When you want five ranges, they are: 1-20, 20-40, 40-60, 60-80, 80-100. Many data sets do not have any objects in some ranges, as data distributions tend to be uneven. The bar graph for this ranging method is quite different from the bar graph for equal records per range. These are typical examples:

The map below shows population shift divided into five ranges of equal size. As before, the darker the shade, the more population has shifted to that state:



This is the distribution graph for the above map:

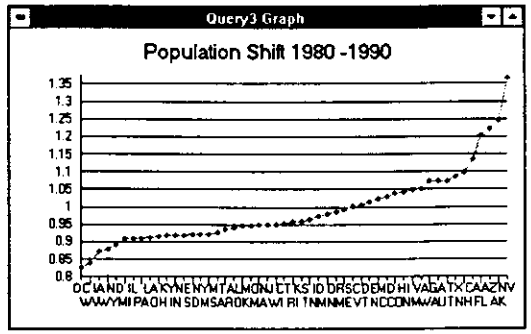


Your final option is to set custom ranges. Determine what values you want and then type them into the Customize Ranges dialog. You can use any method you want to determine the value of your custom ranges. However, MapInfo has two tools which may be of use.

One method of creating custom ranges is to use a graph. To do this you have to sort the data records in order from lowest to highest values (using Select or SQL Select) and then create a graph of the sorted table.

We used an expression to calculate a population shift factor. The expression is such that, if a state's population has kept up with overall population growth, then it has a value of 1. When it has lost population relative to overall population growth, it has a value less than 1. When it has gained population relative to the overall growth, it has a value greater than 1.

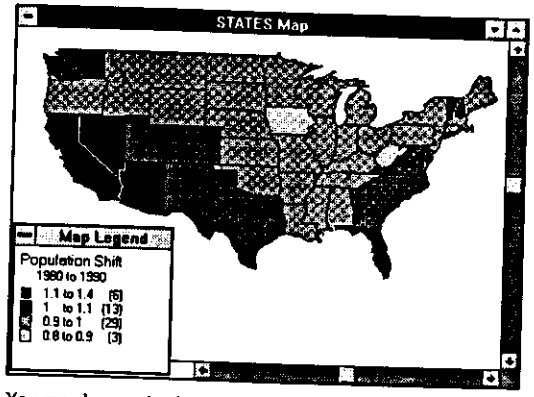
Here is a line graph of the distribution of values for the population shift factor:


Query3 Graph
Population Shift 1980 -1990
1.35
1.3
1.25
1.2
1.15
1.1
1.05
1
0.95
0.9
0.85
0.8
DC IA ND IL LA KY NE NY MT AL MO NJ CT KS ID OR SC DE MD HI VA GA TX CA AZ NV
WA WY MI PA OH IN SD MS AR OK MA WI RI TN MN ME VT NC CO NM WV AL UT NH FL AK

One possible set of ranges:

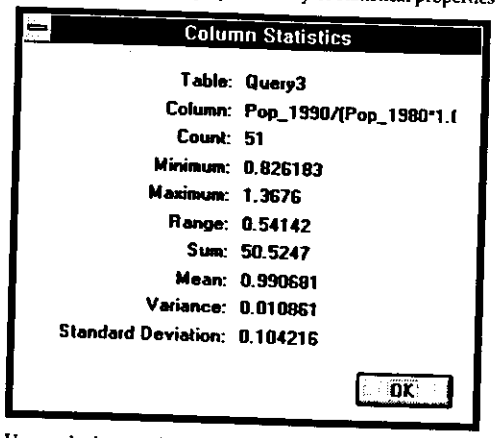
1. 1.1 to 1.4
2. 1 to 1.1: Any states in this range 1 have gained relative to overall growth.
3. .9 to 1: Any states in this or range 4 have lost relative to overall growth.
4. .8 to .9

This is the thematic map created according to these ranges:



You can also use Analyze > Calculate Statistics to create ranges based on the standard deviation for your data.

Calculate Statistics displays a variety of statistical properties for a specified column:



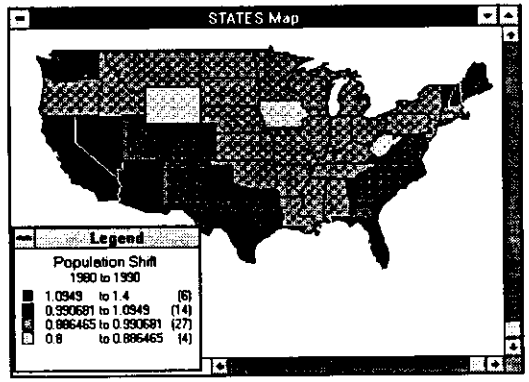
Use a calculator to find the top and bottom value for each range. When you want an odd number of ranges, then the middle range should go from one standard deviation below the mean to one standard deviation above it. When you want an even number of ranges, then the mean is the boundary between your middle two ranges. Once you have calculated your range boundaries, you can type them into Customize Ranges.

We can use four ranges for population shift, as follows:

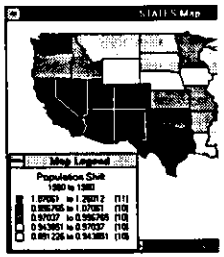
1. More than one standard deviation above the mean.
2. From the mean to one standard deviation above.

3. From the mean to one standard deviation below.
4. More than one standard deviation below the mean.

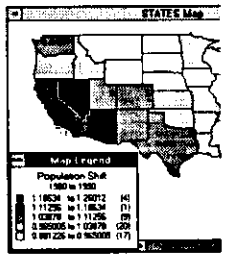
The map below is based on those four ranges:



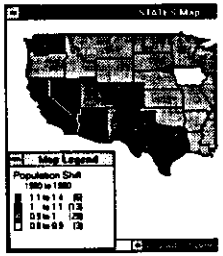
The table below shows the four maps from this section. They all show the same data, but different ranges were used for each. All of them show a population shift toward the Southwest. But there are differences between them, especially in the Southeast and Northwest.



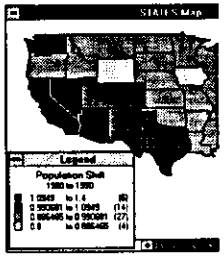
Equal Records per Range



Equal Size Ranges



Custom Values from Graph



Custom Values based on Mean and Standard Deviation

Finally, while we have used a map of regions to illustrate the possibilities of thematic ranges, the general principles apply to ranged maps of lines and symbols as well.

Setting How Your Ranges Display

MapInfo also lets you determine just how each range is displayed on the map. Regardless of whether you are shading regions, lines, or points, you can choose custom colors.

Since the purpose of desktop mapping is to increase intuitive understanding, you want to use shading schemes that help us to see the patterns in our data. One scheme is to use varying shades of the same color (or hue). When you use green, then you could have the highest range display in dark green and the lowest range in a very light green. Intermediate ranges would be in intermediate shades.

There may be situations where you have so many ranges that it is difficult to use different shades of one color. In that case you should choose a color scheme which presents a coherent transition from one color to another. One common scheme is to start with red for the highest data values and move through lighter shades to white and from there to move to dark blue through darker shades of blue. Another scheme is to use colors in the order they are in the spectrum, from red through orange, yellow, green, blue to violet.

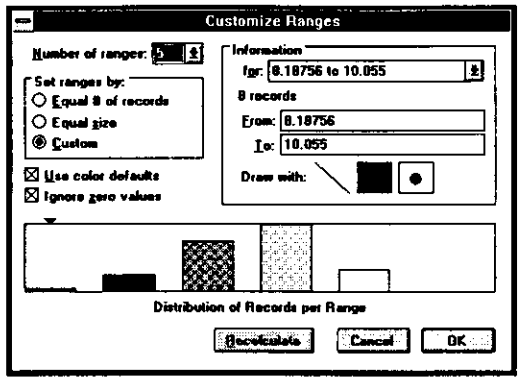
When you are shading regions, you may want to use a different fill pattern for each range. You can also set the line style and color for region borders. For example, you might want to use a light colored line for your darkest range. That way if there are several adjacent regions in this range, you can easily see the borders between them.

When you are shading lines, you might want to use different width lines for each range. This would be especially useful if the lines represent travel or trade routes. You could use a different width line to represent different amounts of travel or trade over the route.

When you are shading symbols, you could use a different symbol for each range or you could specify a different size of symbol for each range. Note that using a different sized symbol for different thematic ranges is different from using graduated symbols (see page 397). In the case of ranged symbols, the size of the symbol is not directly proportional to the data value. The size simply indicates a range of values. In graduated symbols, the size of the symbol is directly proportionate to the data value.

Using the Customize Ranges Dialog

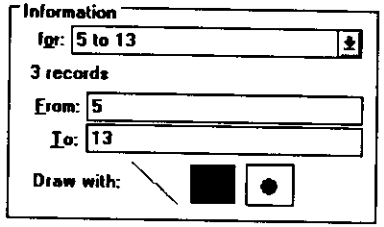
The Customize Range of Values dialog is laid out in three areas. The upper left is for setting the number and statistical properties of the ranges. The upper right tells you the number of records per range, the values in the range, and how the objects in the range are to appear. The bottom area gives a bar graph indicating the distribution of the records in the ranges.



Number of ranges: The default number is 4. Use the up or down arrow to change this to a number from 1 to 16.

Set ranges by: Gives you three choices:

- Equal number of records: The ranges are chosen so that each has the same number of records (approximately).
- Equal size: The ranges span the same distance between the top and bottom value in the range.
- Custom: Indicates that the ranges are user-defined. You specify custom ranges in the Information area (upper right quadrant) of the dialog box:

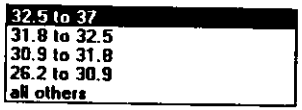


Use Color Defaults: When this is checked, MapInfo uses colors as the default range fills. When it is unchecked, MapInfo uses black and white patterns as the default range fills. Whether or not this is checked by default depends on Color Defaults, set in Edit > Preferences > System.

- When Color Defaults is set to Color, Use Color Defaults is checked by default.
- When Color Defaults is set to Monitor, Use Color Defaults is checked by default only if you are using a color monitor. When you are using a black and white monitor it is not checked.
- When Color Defaults is set to Black & White, Use Color Defaults is not be checked by default in any circumstance.

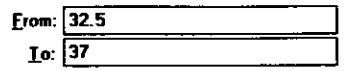
Ignore Zero Values: Some records may have zero values on the thematic variable. When this box is checked, MapInfo ignores those records in setting up thematic ranges.

Information Box: The controls in this box let you set exact ranges and display settings for each range. A menu displays the current ranges. For example:



You can change those range boundaries by selecting the appropriate range from the menu or by clicking on the appropriate bar in the distribution graph at the bottom of the dialog. There are two things you can then change:

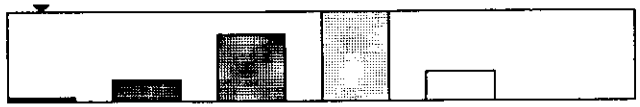
To set the end points of a data range type the minimum (From) and maximum (To) values in the range text boxes.



Note that when MapInfo displays the value of range boundaries, it gives the same number for the upper boundary of one range and the lower boundary of the range above it. The record (or records) with a value on a range boundary always get counted in the higher of the two ranges. For example, one range goes from 26.2 to 30.9 and the range above starts with 30.9 and go to 31.8. The record (or records) with the value 30.9 are counted in the upper range (30.9 to 31.8), not the lower (26.2 to 30.9).

To change the display settings for a range click on the line, fill, or symbol.

MapInfo displays a Picker that you use to choose the type of line, fill, or symbol you want for that range.



Distribution of Records per Range

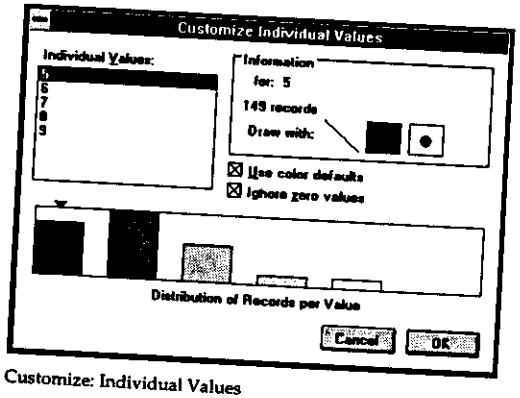
Distribution of Records per Range: This box displays a bar chart giving the distribution of records per range, starting with the first range, the one with the highest values, on the left. The bars are in the color and pattern which that range displays on the map. A pointer at the top of the chart box indicates which range is currently available for customizing. When you want to change the color and/or pattern of a bar, you can double-click on the bar and MapInfo displays a palette in which you can choose a color. Or, if you simply click on the bar, MapInfo displays its information in the Information area and you can change display settings there.

Recalculate: When you change the number of ranges, or the criteria for setting the range (Set ranges by), the range distribution box is blanked and displays the following message: "Press recalculate to see distribution based on new settings." When you press Recalculate, MapInfo recalculates the ranges and display a new distribution of objects in the box.

Cancel: Cancels your customizing and returns you to the main Shade by value dialog.

OK: Causes MapInfo to customize according to your specifications and to redraw the map.

Individual Values

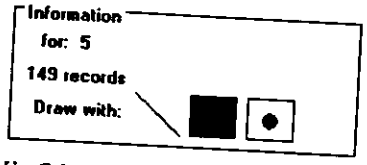


Customize: Individual Values

You can customize the line, fill, and symbol used to represent each individual value.

Individual Value: Select the particular data value from the list.

Information: Tells you which value is currently being customized and how many records have the value. By clicking on one of the three areas to the right of Draw With you can customize the line, fill, and/or symbol used to represent that value.



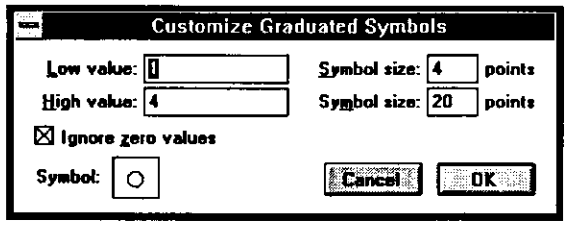
Use Color Defaults: When this is checked, MapInfo uses colors as the default range fills. When it is unchecked, MapInfo uses black and white patterns as the default range fills.

Ignore Zero Values: Some records may have zero values on the thematic variable. When this box is checked, MapInfo places these records in an "All Others" range.

Distribution Of Records Per Value: Displays a bar chart representing how many records are distributed to each value.

Note: You can only shade about 100 different objects by individual values.

Graduated Symbols



Customize: Graduated Symbols

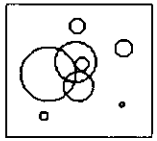
This dialog allows you to pick which symbol you want to use and to set its minimum and maximum size.

Low Value, High Value: These boxes display the low and high values for the thematic variable.

Symbol Size: The top box displays the symbol size that corresponds to the lowest thematic value while the bottom box displays the symbol size that corresponds to the highest thematic variable. You can change these values to suit, the range is between 1 and 48 points. MapInfo interpolates the size of symbols between these two values. A data value that is about halfway between the minimum and maximum data value is represented by a symbol that is about halfway between the minimum and maximum symbol size.

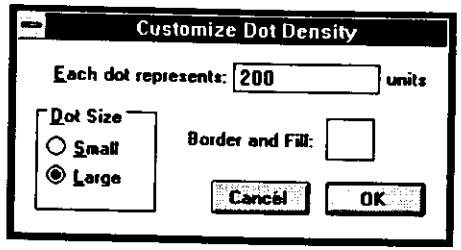
Ignore Zero Values: When this box is checked, MapInfo ignores records that have a value of zero for the thematic variable.

Symbol: When you click on this box, MapInfo displays the Pick Symbol dialog, in that you can choose a symbol. You can also pick the symbol's color. The default symbol is a "hollow" circle, that is, a circle without any fill pattern. This allows overlapping symbols to display.



Overlapping symbols show through

Dot Density



Customize: Dot Density

There are three options that you can customize on a dot density map:

Each Dot Represents:____ Units: Set the number of units you wish each dot to represent. MapInfo makes a guess at how many units each dot should represent and places this guess in the text box. You can type in a different number if you wish. Obviously, the more units that are represented by a single dot, the fewer dots that are on the map.

Size Of The Dots: You can have small dots (one pixel) or large dots (four pixels).

Border And Fill Of The Boundary: You can specify a border and fill for the boundaries that are drawn under the dots. The default is black borders and hollow fill.

A-
About MapInfo for [platform] command, 1
Adding records, 177
Adding/removing fields from tables, 169-170
Add Workspace command, 2
Aerial photographs, digitizing, 57
Align Objects command, 3-10
  Align Objects dialog, 3
  center alignment, 4, 6, 8
  distribute alignment, 4, 6, 8
  left edge alignment, 4, 5
  right edge alignment, 4, 5
Alphanumeric expressions. See Expression
Angle of arc, drawing arcs by specifying, 15
Append command, 11
  Append Table dialog, 11
  Join Tables vs Append, 136
Appending data. See Combining data from tables
Applications and images exported from MapInfo, 79
Arc tool, 12-16
  Arc Object dialog, 15
  attributes box, 15
  repositioning an arc, 13
  reshaping an arc, 14-16
  resizing an arc, 14
Area graphs, 110
Area units, specifying, 244
Arrange Icons command [MapInfo for Windows only], 17
ASC II files, Delimited
  exporting, 75
  opening, 181-182
Aspect Ratio Adjustment preferences, 205
  adjustments for running Windows, 205
  for various platforms, 205
Assist command, 18
  Expression dialog, 18
  Select dialog, 18
attributes, 104
AutoCAD DXF export, 75-76
  MapInfo objects and corresponding DXF entity, 76
  coordinate transformation, 75-76
AutoCAD DXF import, 119-128
  coordinate system, choosing, 122-123
  coordinate transformations, 123-126
  DXF Import Information dialog, 121-122
  DXF attributes, preserving, 126-128
  nested blocks, importing attributes via, 127-128
  using, 120-121

B-
Background color, 93
BACKSPACE key to clear objects, 36
Bar graphs, 111
BDY2MIF utility, 118-119
.BMP file, creating via Export Window, 78-79
Bottom edge alignment, Layout Window, 4, 7
Break Polygon command, 19
Bring to Front command, 20
Browse command, 21-24
  adding a column, 24
  customizing a browser, 24
  Pick Fields dialog, 23
  rearranging browser column order, 23
  removing columns, 24
  resizing columns, 24
  scrolling a table, 23
  tools available in Browser, 254
  using a browser, 21-22
Buffer command, 25-27
  Buffer Objects dialog, 26
  creating layer for buffer polygon, 25
  Layer Control dialog, 25
Buffer polygon, 25

C-
Calculate Statistics command, 28-30
  Calculate Column Statistics dialog, 28
  Column Statistics dialog, 29
  Standard deviation in thematic ranges, 29-30
Cartesian coordinates, CAD drawings, 123
Cascade Windows command, 31
Center alignment, Layout Window, 4, 6, 8
Changing. See also Editing
  column order in tables, 11, 169-170, 256-267
  fields displayed in Browser, 286
  fill pattern and color, 187-190
  fonts, 191-192, 271
  frame contents, 92
  front-to-back order, Layout Window, 20, 147-151, 239
  graphic objects via attributes, 217
  label style, 140
  line style, 192-194
  nodes, 221-222
  text style, 271
Change View command, 32-33
Character field types, 174
Choose Projection command, 34-35
  projections, list of, 35
  time to display map, 35
Clear command, 36

Clear Cosmetic Layer command, 37
Clear Objects Only command, 38
Clipboard
  copying to via Copy, 41
  copying to via Cut, 54-55
  merging objects, 161-162
  merging regions, 160-161
Close command, 39
Close All command, 40
Closing
  all tables (Mappers, Graphers, Layouts, and Browsers), 40
  layers of a Mapper, 39
  tables, 39
  query tables, 39
Combining data from tables
  via Append, 11
  via Join, 131-133
  via Merge Using Column, 163-168
  via Modify Structure, 169-170
  via SQL Select, 256-267
Command line, files supported on, 268
CONTROL key, 20, 129, 138
Converting
  data types, 11
  MapInfo data for various computer systems, 47
Color Defaults preferences, 204-205
Colors, customizing, 189
Component files, 219
Coordinates
  digitizer setup, 59
  for various platforms, 47
  units, specifying, 243
Copy command, 41
  BITMAP [PICT] and TEXT options, 41
Copying
  from clipboard, 185
  to clipboard, 41
  graphics, 41
  text, 41
Copy to Clipboard preferences, 204
  BITMAP [PICT] and TEXT options, 204
Cosmetic Layer command, 42-43
  editing or selecting, 42, 146
  saving, 42-43
Create Drop Shadows command, 44-45
  default values, 45
Create Points command, 46-47
Creating. See also Drawing
  call-outs, 273
  control points for digitizing, 60
  labels. See Labels
  legend for graphs, 48-49
  legend for maps, 50-53
  new table from edited (or to be edited) table, 227-229
  new table from query table, 227-229
  Pointfiles, 46-47
  point objects for files with coordinates, 46-67
  query tables, 256-267
  tables, 171-176, 256-267
  titles, labels, and annotations, 272
  window frames, 91-96
Customize Legend (Graph) command, 48-49
  Font Picker dialog, 49
Customize Legend (Map) command, 50-53
  defaults, 51, 53
  specifying layer, title, and subtitle, 51
  specifying how legend displays thematic range, 51-52
  specifying range values and display, 52-53
Cut command, 54-55

D-
Data. See Tables
Data, converting, 11, 47
Date field types, 174
dBASE DBF file
  exporting, 74
  opening, 181
Decimal field types, 174
Defaults. See Preferences
DELETE key to clear objects, 36
Digitizer Setup command, 57-63
  control points and error estimates, 57-58
  control points, working with, 59-62
  digitizer buttons, configuring, 58
  map units, 62
  Set Digitizer buttons dialog, 63
  setup, implementing or canceling, 62
  projection, 57
Disk space, saving via Pack, 184
Distance
  measuring, 226-227
  units, specifying, 244
Distribute alignment, Layout Window, 4, 6, 8
Display Options command, 64-66
  always display frame contents, 64-65
  Layout Display Options dialog, 64
  only when Layout Window is active, 65
  only file name and type, 66
  show page breaks, 66
  show rulers, 66
  show current zoom, 66
Delete Table command, 56
Draw Autolabels command, 67-68
  Autolabel Layer dialog, 67-68
Drawing
  arcs, 12-16
  buffers, 25-27
  in Cosmetic Layer, 42-43
  curved lines, 201
  "doughnut" polygon, 161
  drop shadows, 44-45
  ellipses, 70-71
  graphs, 107-115, 240-241, 283-287
  labels, 67-68
  pie charts, 112, 241-242
  polygons (regions), 199-200
  polylines from polygons, 19, 201-202
  rectangles and squares, 216-217
  rounded rectangles, 224-225
  smooth, 255
  straight lines, 155
  unsmooth, 280
  window frames, 91-96
Drop shadows, 44-45
DXF export/import, 75-76, 119-128
  coordinate transformations, 123-126
  technical notes about file format, 120

E-
Earth map
  creating new, 173-174
  digitizing, 57
  importing, 122-123
  longitude/latitude projection for, 173-174
Edit (Browser) command, 69
Editing. See also Changing
  control points for digitizing, 61
  Cosmetic Layer, 42-43
  fill pattern and color, 187-190
  object attributes, 104
  objects via Select tool, 236-237
  polygons, polylines, and arcs, 221-222
  rows in Browser, 237-238
  tables, 69, 177, 272-276
Ellipse tool, 70-71
  Ellipse Object dialog, 71
ESCAPE key, 218
Excel spreadsheets, opening, 182-183
Exit [Quit] command, 72
Export command, 73-77
  ASC II export, 75
  AutoCAD DXF export, 75-76
  dBASE DBF export, 74
  in different projection, 77
  MIF export, 74
Export Window command, 78-79
  sizing/resizing image, 78
Expression command, 80-84
  character strings, 82
  commands supporting, 81
  comparison operators, 83
  creating, 80
  dates in, 82
  keywords, 84
  logical operators, 83
  mathematical operators, 82-83
  numbers in, 82
  operator precedence, 84
  parameters for, 81
  string operators, 83
Expressions, creating
  via Expressions, 80-84
  while selecting data, 18

F-
Field types, 174-175
Fields. See also Tables
  adding/removing, 169-170, 173
  creating, 169-176
  selecting to display in Browser, 187
File(s)
  .ABB file, 88
  .APP file, 268
  ASC II files, Delimited, 75, 181-182
  .BMP file, 78-79
  dBASE DBF file, 74, 181
  imported, creating Pointfiles for, 46
  MAPINFO.ABB, 88, 100
  STARTUP.WOR, 268-269
  .TAB file, 56, 268
  .WMF file, 78-79
  .WOR file, 268
File preferences, setting, 206-207
Fill pattern and color, 188-189
Fill style and objects, 189-190
Find command, 85-88
  accessing Find dialog, 86, 87
  options, 88
  parameters, 86, 87
  refining the search, 86
  search table, specifying, 86
  street address, locating via, 88
  using, 85
Find Selection command, 89
Float field types, 147

Font command, 90
Font Picker, 49
Frame tool, 91-96
  browser display, 95
  frame attributes, 96
  frame border and background, 93
  frame contents, changing, 92
  grapher display, 94-95
  graph legend, 95
  map legend, 94
  map proportions, 93-94

G-
Geocode command, 97-103
  automatic geocoding, 101
  finding uncoded records, 102-103
  interactive geocoding, 102
  interrupting automatic geocoding, 101
  options, 99-100
  refining your search, 99
  using, 97-99
Get Info command, 104
Grabber tool, 105-106
Graph command, 107
Graph Type command, 108-115
  area graphs, 110
  bar graphs, 111
  custom graphs, 114-115
  line graphs, 111
  pie graphs, 112
  using, 108-110
  X-Y graphs, 113
Graphic objects in records, 173
Graphics, copying, 41
Grid, 245

H-
Help command, 116
Highlight Control preferences, 208
Horizontal alignment of objects, 3-10

I-
Icons, arranging, 17
IMG import format, 117
Import command, 117-128
  DXF format, 117, 119-128
  IMG format, 117
  MapInfo for DOS files, 118-119
  MBI format, 117
  MIF format, 117, 118
  MMI format, 117
  procedure, 118
  vector graphic files, 117
Indexed field, defining, 173
Info tool, 129-130
  font style change, methods for various computers, 130
Info Window, displaying in Browser, 238
Integer field types, 174

J-
Join command, 131-133
  autojoin, 131
  geographic and descriptive join, 131
  Specify Join dialog, 132-133
Join Tables command, 134-136
  Join Tables vs Append, 136
  method for joining, 135-136, 257

L-
Label(s)
  call-outs, 273
  creating, 67, 138-139, 145
  deleting, 68, 139
  duplicating, 68
Label Axis command, 137
Label tool, 138-140
  changing label style, 140
  creating labels, 138-139
  moving labels, 140
  removing labels, 139
Layer(s). See also Layer Control; Layer Settings
  closing, 39
  creating, 156
  displaying, 141-142
  editable/selectable settings, 144
  labeling, 67-68
Layer Control command, 141-142
  add/remove, 142
  creating buffer polygons, 25
  reorder, 142
Layer Settings command, 143-146
  Cosmetic Layer settings, 146
  editable/selectable settings, 144
  expressions for setting labels, 145-146
  display settings, 144
  font label recommendations, 145
  labels settings, 145
  zoom layering, 144
Layout command, 147-151. See also Layout Window
  framing options, 148-149
  front-to-back ordering of objects, 150
  Layout Window description, 149
  New Layout Window dialog, 148
  tools active in, 150, 254
  zoom setting using numerical keys, 151
Layout Size command, 152-154
  non-printing area of page, 154
  paper size, 154
  setting layout margins for individual pages, 152-153
  setting margins for multi-page layouts, 153-154
  setting number of pages, 152
Layout Window
  change front-to-back order, 20, 147-151, 239
  display options, 64-66
  positioning objects in, 3-10
  printing, 212-213
  window frames in, 91-96
Left edge alignment, Layout Window, 4, 5
Legend for graphs, 48-49, 246
Legend for maps, 50-53, 246
Line+Fill Picker, 247
Line graphs, 111
Line style, 93
Line tool, 155
Logical expressions. See Expression
Logical field types, 147
Longitude/latitude projection, 173
Lotus spreadsheets, opening, 182-183

M-
Map command, 156-158.
  creating layers, 156
  Key position and information displayed, 157
  Mapper, description of, 157
  Map Table dialog, 156
  preferences, setting, 207-210
  printing, 213-214
  projections, selecting, 34-35
  repositioning, 105-106
  rescaling and/or resizing, 32-33, 157-158
  scroll bars, 158
  selecting tables, 156
  tools active, 158, 254
MapBasic
  issuing commands via MapBasic window, 248-250
  run applications via startup workspace, 268
MapBasic tool, 159
MAPINFO.ABB file, 88, 100
MapInfo for DOS
  creating Pointfiles for, 46-47
  converting data to degrees, 47
  importing files from, 118-119
Map Key, specifying what is displayed in, 32-33
MAP2MIF utility, 118-119
Mapper. See Map
Map scale, specifying, 32-33
Margins
  for individual pages, 152-153
  for multi-page layouts, 153-154
Mathematical expressions. See Expression
MBI import format, 117
Merge from Clipboard command, 160-162
  merging objects via, 161-162
  merging regions via, 160-161
Merge Using Column command, 163-168
  data assignment statements, 165
  example usage, 163, 166-168
  merging regions via, 163
  source/destination tables, 164
Metric Distance and Area Units preferences, 210
MIF export/import, 74, 117
MMI import format, 117
Modify Structure command, 169-170
  add/remove fields, 170
  disk space requirements for, 170
Move Duplicate Nodes In preferences, 209-210

N-
Native coordinates, 47
New command, 171-176
  adding/removing fields, 173
  creating table structure, 172-175
  earth map, 173
  field information, specifying, 172-175
  file name for new table, 175
  graphic objects, 173
  New Table dialog, 171
  non-earth map, 173
  Non-Earth Coordinate System dialog, 175-176
  projections, selecting, 175
New Record command, 177
Non-earth maps
  bounds, recommended, 176
  defining coordinate system for new maps, 176
  importing, 122-123
  digitizing, 57

O-
Open command, 178-183
  Browser display, 180
  converting files to MapInfo format via Save Copy As, 179
  dBASE DBF files, 178, 180, 181
  delimited ASC II files, 178, 181-182

graphic files, 179
Lotus 1-2-3, 178, 180
MapInfo files, 180
Mapper display, 180
Microsoft Excel files, 178, 180
opening files vs importing, 178

P-
Pack command, 184
Pack Table dialog, 184
Paper and Layout Units preferences, 206
Paper size, 154
Paste command, 185
Pick Fields command, 186
Pick Fill command, 187-190
custom colors, 189
fill pattern and color, 188-189
fill style and objects, 189-190
Pick Font command, 191-192
font changing, effects of, 192
Sample Text window, 192
Pick Line command, 192-194
changing, effect of, 193
color, 193
method for frequent use, 194
style, 193-194
thickness, 192-193
Pick Symbol command, 195-196
changing, effect of, 196
method for frequent use, 195
shape, color, and size, 195-196
PICT file, creating via Export Window, 78-79
Pie graphs, 112
Polygon Search Selector tool, 197-198
attributes of polygon (region) objects, 200
setting layers for, 197
<SHIFT>-Select, special usage, 197-198
Polygon tool, 199-200
drawing polygons with, 199-200
Polyline, definition, 201
Polyline tool, 201-202
attributes of polyline objects, 202
drawing curved lines, 201-202
drawing polylines, 201-202
Preferences command, 203-210
file settings, 206-207
map settings, 207-210
system settings, 204-206
Previous View command, 211
Print command, 212-214
graph, 214
layout, 212-213

map, 213-214
Projections, 34-35
for digitized maps, 57
for importing maps, 122-123
for new tables, 175-176
saving, 227-229
selecting, 34-35, 175

Q-
Querying. See SQL Select
Query tables
closing, 39
creating, 256-267
saving, 39

R-
Radius of arc, drawing arcs by specifying, 15
Radius Search Selector tool, 215
Read-only tables, 177
Rectangle tool, 216-217
Redraw Window command, 218
Removing
control points for digitizing, 61-62
data from tables, 54-55
graphic objects from table, 38
labels, 68
nodes, 221
objects from cosmetic layer, 37
tables, 56
Rename Table command, 219-220
and component files, 219
Reposition a map, 105-106
Reshape command, 221-222
moving, deleting, adding nodes, 221-222
reshape edit handles, 221
Reshape Mode, toggling, 221
Resizing Map Window preferences, 208
Revert command, 223
Right edge alignment, Layout Window, 4, 5
Rounded Rectangle tool, 224-225
attributes of rounded rectangle objects, 224-225
Ruler tool, 226-227
measuring distance with, 226-227
Run command, 228
Run MapBasic Application dialog, 228

S-
Save command, 226
Save Copy As command, 227-229
saving and creating new table, 227-229
Save Cosmetic Objects command, 230
to existing table, 230

to new table, 230
Save Workspace As command, 231
Saving
active window to a file, 78-79
and creating new table, 227-229
Cosmetic Layer, 43
cosmetic objects, 230
layout window alignment, 4
map projections, 34
query tables, 39
table edits, 226
workspaces, 231
Scatter plots, 113
Searching. See Selecting
Search symbol, 86
Search table, 86
Select command, 232-233
Browser or Mapper highlighting , 232
results table, 233
specifying search criteria, 232
Select All command, 234
Selecting
all objects in table or window, 234
Cosmetic layer, 42-43
fields to display in Browser, 186
fonts, 49, 51, 90
objects from tables, 85-88, 89
objects via Select tool, 235-238
objects within a specified radius, 215
symbols, 195-196
Select tool, 235-238
Browser, using in, 237-238
CONTROL [Option] key used with, 236
editing objects via, 236-237
edit handles, 236
"hot spot" for point objects, 236
selecting/deselecting objects, 235-236
Send to Back command, 239
Ordering layout Window, 239
Series command, 240-242
graphs, customizing via, 240-241
pie charts, customizing via, 241-242
Set Map Units command, 243-244
area units, 244
coordinate units, 243
distance units, 244
Shade by Value, 245
SHIFT key
to align objects in Layout Window, 3
to draw lines, 155
to draw rounded rectangles, 224
to select objects, 44

Show/Hide Grid command, 246
Show/Hide Legend command, 247
Show/Hide Line+Fill Picker command, 248
Show/Hide MapBasic Window command, 249-251
examples, 250-251
issuing commands through MapBasic window, 250
Show/Hide Statistics command, 252
Show/Hide Symbol Picker command, 253
Show/Hide Tool Palette command, 254-255
Small integer field types, 174
Smooth command, 256
Snap Tolerance preferences, 209
Snap to Node preferences, 208-209
Sorting. See SQL Select dialog, 259-266
Spreadsheets, opening, 182-183
SQL Select command, 257-268. See also SQL Select dialog
aggregate functions, 262-264
assembly, concept of, 258
creating queries, 259-262
creating query tables via, 257-268
derived information, concept of, 257-258
geographic operators, 264-268
joining tables, 258, 264
subselects, 266-268
Update Column and, 268
SQL Select dialog
alias for column name, 260
creating subqueries, 266
order by columns, 262
naming the query table, 262
select columns, 259-261
sort keywords, 262
specify tables, 260
specify conditions, 260-261
Standard deviation in thematic ranges, 30-31
Startup.Wor, 269-270
creating startup workspace, 269
running MapBasic via, 269
Statistics window, 252
StreetInfo tables, 178
Subtitles for graphs, 49-50
Symbol Picker, 46, 253
Symbol tool, 271
attributes of point objects, 271
System preferences, setting, 204-206

T-
.tab file,, 56, 269
Tables
adding records, 177

adding/removing fields, 169-170, 173
changing column order, 11, 169-170, 257-268
closing all, 40
closing specific, 39
combining data from, 11
copying data via clipboard, 54-55
creating new, 171-176, 257-268
discarding edits, 223
editing, 69, 273-277
field types, 174-175
geocoding, 97-103
graphing, 107
merging, 160-162, 163-168
opening, 22, 178183
packing, 184
query, 257-262
read-only, 177, 178
removing (deleting), 56
removing text from, 54
removing graphic objects from, 38, 54
results table, 233
saving, 39, 72, 226
selecting objects, 85-88
viewing text data in Browser, 21-24
Text, copying, 41
Text Style command, 272
Text tool, 273-277
creating call-outs, 274
editing text, 273-274
using in Browser, 275
using in Mappers and Layouts, 273
setting line spacing, alignment, and rotation angle, 273
rotated text in windows 3.0, 277
text attributes, 276-277
text size, 275
Thematic mapping
creating legends, 50-53
Tile Windows command, 278
Titles for graphs, 48-49
Tool Palette preferences, 205-206
Tools available in Browser, Mapper, and Layout, list of, 255
Top edge alignment, Layout Window, 4, 7

U-
Undo command, 279
Unselect All command, 280
alternate methods, 280
Unsmooth command, 280
Update Column command, 282-283

putting graphic information into visible columns via, 283
restriction, 282
and SQL Select query table, 283

V-
Value Axis command, 284-288
examples, 286-288
gridlines, 284, 285
labels and titles, 286
setting axis values, 284-285
tick marks, 284, 285
Version number, displaying, 1
Vertical alignment of objects, 3-10
View Actual Size command, 289
View Entire Layer command, 290
View Full Layout command, 291
Viewing
large maps, 290
magnifying maps, 292-293
reducing maps, 293-294
rescale or reposition Mapper, 32
text data in a Browser (tabular form). See Browse

W-
Window(s)
drop shadows, 44-45
frames, creating, 91-96
layout. See Layout windows
resizing and tiling, 31, 278
Windows to Open preferences, 206-207
.WMF file, creating via Export Window, 78-79
Workspace(s)
combining current tables/windows with, 2
opening, 2
saving, 231
Startup.Wor, 269-2670
Workspace Options preferences, 207

X-
X-Y graphs, 113

Z-
Zoom-in tool, 292-293
magnification factor, 291
Zoom-out tool, 294-295
reduction factor, 294
Zoom (window width), specifying, 32-33

Menu Paths

Analyze>Calculate Statistics, 28
Analyze>Customize Legend, 48-53
Analyze>Find, 85-88
Analyze>Find Selection, 89
Analyze>Select, 232-233
Analyze>Select All, 234
Analyze>SQL Select, 257-268
Analyze>Unselect All, 280
Analyze>Select>Assist, 18
Analyze>Shade by Value>, 245
Analyze>Shade by Value>Expression, 80- 84
Analyze>Shade by Value>Join, 131-133
Analyze>Select>Assist>Expression, 80-84
Browse>New Record, 177
Browse>Show/Hide Grid, 246
Browse>Pick Fields, 186
Digitizer Setup>Projection, 34-35
Edit>Break Polygon, 19
Edit>Clear, 36
Edit>Copy, 41
Edit>Cut, 54-55
Edit>Get Info, 104
Edit>Paste, 185
Edit>Preferences, 204-211
Edit>Smooth, 256
Edit>Undo, 279
Edit>Unsmooth, 281
Edit>Objects>Buffer, 25-27
Edit>Objects>Merge from Clipboard, 160-161
Edit>Preferences>System Preferences, 41
Edit>Remove Objects, 38
Edit>Reshape, 221-222
File>About MapInfo, 1
File>Add Workspace, 2
File>Close, 39
File>Close All, 40
File>Exit, 72
File>Help, 116
File>New, 171-176
File>Open, 178-183
File>Print, 212-214
File>Revert, 223
File>Run, 228
File>Save, 226
File>Save Copy As, 227-229
File>Save Workspace As, 231
Graph>Graph Type, 108-115
Graph>Label Axis, 137
Graph>Series, 240-241
Graph>Value Axis, 284-288
Layout>Create Drop Shadows, 44-45
Layout>Display Options, 64-66
Layout>Layout Size, 152-154
Layout>Previous View, 211
Layout>View Actual Size, 289
Layout>Sent to Back, 239
Map>Change View, 32-33
Map>Clear Cosmetic Layer, 37
Map>Choose Projection, 34-35
Map>Digitizer Setup, 57-63
Map>Draw Autolabels, 67-68
Map>Layer Control, 141-142
Map>Layer Control>Cosmetic Layer, 42-43
Map>Layer Control>Layer Settings>Label with Column>Expression, 80-84
Map>Layer Control>Settings..., 143-146
Map>Previous View, 211
Map>Save Cosmetic Objects, 230
Map>Set Map Units, 243-244
Map>View Entire Layer, 290-291
New>...>Projection, 34-35
Save As>...>Projection, 34-35
Style>Font, 90
Style>Pick Fill, 188-190
Style>Pick Font, 191-192
Style>Pick Line, 192-194
Style>Pick Symbol, 195-196
Style>Text Style, 272
Table>Append, 11
Table>Create Points, 46-47
Table>Delete Table, 56
Table>Export, 73-77
Table>Geocode, 97-103
Table>Import, 117-128
Table>Join>Join Tables, 131-133
Table>Join Tables, 134-136
Table>Merge Using Column, 163-168
Table>Modify Structure, 169
Table>Pack, 184
Table>Rename Table, 219-220
Table>Update Column, 282-283
Table>Update Column>Expression, 80-84
Window>Arrange Icons, 17
Window>Browse, 21-24
Window>Cascade Windows, 31
Window>Browse, 21-24
Window>Browse>Edit, 69
Window>Export Window, 78-79
Window>Graph, 107
Window>Layout, 147-151
Window>Layout>Align Objects, 3-10
Window>Layout>Bring to Front, 20
Window>Map, 156-158

Window>Redraw Window, 218
Window>Show/Hide Legend, 247
Window>Show/Hide Line+Fill Picker, 248
Window>Show/Hide MapBasic Window, 249-251
Window>Show/Hide Statistics, 252
Window>Show/Hide Symbol Picker, 253
Window>Show/Hide Tool Palette, 254-255
Window>Tile Windows, 278

Customer Service Offers You:

Regional Training Courses

Our classes provide you with the most effective learning environment possible. Every class is limited to eight to ten people, which allows the instructor to give each student personal attention throughout the course.

Our curriculum is designed for hands-on instruction. A computer is provided for each student so that he/she actually performs each of the course exercises. The course is designed to show MapInfo's features in a step-by-step, application oriented manner.

On-Site Training and Consulting

We'll send our instructor to your location to teach any of our MapInfo courses or tailor a course for your specific needs. Our consultants can also provide support and specific instruction to show you the most effective ways to get your job done. Very often we can show you more new ways to see your data.

You'll gain the benefits of personal, private instruction and save time and money by eliminating travel and related costs for your group. Very often an on-site class for three or more students will cost less than a regional class. There is a ten person per class limit. On-site training requires you to supply computers and any additional hardware for each student.

Price: $1,000.00 per day plus trainer's travel and living expenses.

Custom Programming

Our programmers can tailor your MapInfo application for automated task completion, greater ease-of-use, flexibility, or to more specifically address your needs.

If you don't want to do-it-yourself, our staff can design and create your application for you! Our experience and efficiency will save you both time and money.

Technical Support

For MapInfo, we provide toll-free support in the U.S. and Canada for the first 90 days after you order the product. After this period, you can purchase technical support annually from MapInfo.

For MapBasic and MapCode, we provide free installation support for the first 30 days. You can purchase technical support annually from MapInfo. This support includes assistance with error messages, suggestion for cause, referrals to documentation and explanations of tools.